

Jas. F. Baillie
Jan. 23, 1929

JOURNAL AND PROCEEDINGS
OF THE
HAMILTON ASSOCIATION
1884-1885.

EDITED BY THE HONORARY SECRETARIES.

VOLUME I. PART II.

*Authors of Papers are alone responsible for the statements made and the
opinions expressed therein.*



PRINTED FOR THE HAMILTON ASSOCIATION
BY THE SPECTATOR PRINTING CO.

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HAMILTON ASSOCIATION.

(For the Cultivation of Literature, Science and Art.)

OFFICERS FOR 1884-5.

PRESIDENT,

JOHN D. MACDONALD, M. D.

VICE-PRESIDENTS,

H. B. WITTON, REV. C. H. MOCKRIDGE, M. A., D. D.

HONORARY SECRETARIES,

GEORGE DICKSON, M.A., A. ALEXANDER.

HONORARY TREASURER,

RICHARD BULL.

HONORARY CURATOR AND LIBRARIAN.

WILLIAM TURNBULL.

COUNCIL,

W. A. ROBINSON, A. GAVILLER, A. F. FORBES, T. MCILWRAITH,
R. HINCHLIFFE.

MUSEUM AND LIBRARY,

JAMES STREET NORTH, HAMILTON.

NOTICE.

THE HAMILTON ASSOCIATION was instituted on 2nd November, 1857, and continued its regular meetings to the close of the year 1860. During the period between 1861 and 1871 the meetings were held at irregular intervals, the office bearers of 1860 holding office in the meantime. During the years 1871, 2, 3, 4 and 5 the Association was more active in its work, regular meetings being held. An interregnum of four years ensued from 1875 to 1880, during which time the Council met at stated intervals. From 1880 to the present time the Association has been in active operation, during which period, in addition to the regular monthly meetings, special meetings have been held under the direction of the Council, the annual meeting held in May, 1885, being the one hundred and thirteenth meeting of the Association.

The Association was incorporated in the year 1883.

OFFICE-BEARS.

	PRESIDENT.	1st VICE-PRES.	2nd VICE-PRES.	COR. SEC.	REC. SEC.	TREAS.	LIBR. AND CUR.
1857	Rev. W. Ormiston, D. D.	John Rae, M. D.	J. B. Hurlburt, M. A., LL.D.	T. C. Keefer, C. E.	Dr. Craigie....	W. H. Park....	A. Harvey.
1858	John Rae, M. D....	Rev. W. Ormiston, D. D.	J. B. Hurlburt, M. A., LL.D.	T. C. Keefer, C. E.	Dr. Craigie....	W. H. Park....	A. Harvey.
1859	Rev. W. Ormiston, D. D.	J. B. Hurlburt, M. A., LL.D.	Chas. Robb.....	T. C. Keefer, C. E.	Dr. Craigie....	W. H. Park....	A. Harvey.
1860	Rev. W. Inglis, D. D.	T. McIlwraith....	Rev. W. Ormiston, D. D.	Dr. Craigie....	Wm. Craigie...	W. H. Park....	Chas. Robb.
1861	Rev. W. Ormiston, D. D.	J. B. Hurlburt, M. A., LL.D.	Rev. W. Inglis, D. D.	Dr. Craigie....	Wm. Craigie...	W. H. Park....	T. McIlwraith.
1871	W. Proudfoot....	Judge Logie.....	R. Bull.....	J. M. Buchan, M. A.	I. B. McQuesten M. A.	W. G. Crawford	T. McIlwraith.
1872	Judge Logie.....	H. B. Witton, M. P.	R. Bull.....	J. M. Buchan, M. A.	I. B. McQuesten M. A.	W. G. Crawford	T. McIlwraith.
1873	H. B. Witton, M. P.	J. M. Buchan, M. A.	A. T. Freed.....	Geo. Dickson, M. A.	Geo. Dickson, M. A.	R. Bull.....	T. McIlwraith.
1874	H. B. Witton, M. P.	J. M. Buchan, M. A.	A. T. Freed.....	Geo. Dickson, M. A.	Geo. Dickson, M. A.	R. Bull.....	T. McIlwraith.
1875	H. B. Witton.....	J. M. Buchan, M. A.	W. H. Mills.....	Geo. Dickson, M. A.	Geo. Dickson, M. A.	A. Macallum, M. A.	T. McIlwraith.
1880	T. McIlwraith.....	Rev. W. P. Wright, M. A.	H. B. Witton...	R. B. Hare, Ph. D.	Geo. Dickson, M. A.	R. Bull.....	A. T. Freed.
1881	J. D. Macdonald, M. D.	R. B. Hare, Ph. D.	B. E. Charlton...	Geo. Dickson, M. A.	A. Robinson, M. A.	R. Bull.....	W. H. Ballard, M. A.
1882	J. D. Macdonald, M. D.	B. E. Charlton...	J. A. Mullin, M. D.	Geo. Dickson, M. A.	Wm. Kennedy.	R. Bull.....	W. H. Ballard, M. A.
1883	J. D. Macdonald, M. D.	B. E. Charlton...	H. B. Witton....	Geo. Dickson, M. A.	Wm. Kennedy.	R. Bull.....	W. H. Ballard, M. A.
1884	J. D. Macdonald, M. D.	H. B. Witton.....	Rev. C. H. Mock- ridge, D. D.	Geo. Dickson, M. A.	A. Alexander..	R. Bull.....	Wm. Turnbull.

MEMBERS OF COUNCIL.

1857—Judge Logie ; Geo. Lowe Reid, C. E. ; A. Baird ; C. Freeland.

1858—Judge Logie : C. Freeland ; Rev. D. Inglis, D.D. ; Adam Brown ; C. Robb.

1859—Rev. D. Inglis, D.D. ; Adam Brown ; Judge Logie ; C. Freeland ; R. Bull.

1860—J. B. Hurlburt, M.A., L.L.D. ; C. Freeland ; Judge Logie ; R. Bull ; Wm. Boulton ; Dr. Laing.

1871—Geo. Lowe Reid, C.E. ; Rev. W. P. Wright, M. A. ; A. Macallum, M. A. ; A. Strange, M.D. ; Rev. A. B. Simpson.

1872—Judge Proudfoot ; Rev. W. P. Wright, M.A. ; John Seath, M.A. ; H. D. Cameron ; A. T. Freed.

1873—Judge Logie ; T. McIlwraith ; Rev. W. P. Wright, M.A. ; A. Alexander ; I. B. McQuesten, M.A.

1874—Judge Logie ; T. McIlwraith ; Rev. W. P. Wright, M. A. ; A. Alexander ; I. B. McQuesten, M.A.

1875—Judge Logie ; T. McIlwraith ; Rev. W. P. Wright, M.A. ; A. Alexander ; I. B. McQuesten, M.A.

1880—M. Leggatt ; I. B. McQuesten, M.A. ; A. Alexander ; Rev. A. Burns, M. A., L.L. D., D.D.

1881—T. McIlwraith ; H. B. Witton ; A. T. Freed ; Rev. W. P. Wright, M.A. ; A. F. Forbes.

1882—T. McIlwraith ; H. B. Witton ; A. T. Freed ; A. F. Forbes ; Rev. C. H. Mockridge, M.A., D.D.

1883—A. Alexander ; A. Gaviller ; A. F. Forbes ; T. McIlwraith ; R. Hinchliffe.

1884—A. Gaviller ; A. F. Forbes ; T. McIlwraith ; R. Hinchliffe ; W. A. Robinson.

LIST OF MEMBERS

—OF THE—

Hamilton Association.

c, Members who have contributed Papers. The Numerals indicate the number of Contributions.

ELECTED.

- 1872 Alexander, A., President of the Horticultural Society.
- 1880 c Anderson, J. N., M. D., Burlington.
- 1882 Anderson, James, M. D., late Resident Physician, Hamilton Hospital.
- 1882 Armour, Robert, C. E., 79 Jackson St. West.
- 1882 Allan Richard.
- 1880 Balfour, James, Architect, Hannah St. W.
- 1880 c Ballard, W. H., M. A., Inspector of Schools, 231 King Street West.
- 1880 Barr, John A., Druggist, cor. York and McNab Sts.
- 1885 Barrett, T. P., Toronto.
- 1881 c Barton, G. M., Barrister, Dundas.
- 1881 Boustead, W., Machinist, 95 Catharine St. North.
- 1881 Bowman, Wm., Wholesale Hardware Merchant, 56 Hunter St. West.
- 1857 Brown, Adam, Wholesale Grocer, 13 Herkimer St. West.
- 1884 Brown, W. E., Cashier, Brown, Balfour & Co., 36 Jackson, St. West.
- 1880 Black, George, Manager G. N. W. Telegraph Co.
- 1885 Buchanan, W. W., Editor.
- 1857 Bull, Richard, Treasurer, Hamilton Association, 14 Hunter St. East.
- 1880 Burns, Rev. A., M. A., L. L. D., D. D., President Hamilton Wesleyan Female College.
- 1885 Burkholder, R. C., Printer, Wentworth St.

- 1880 Briggs, S., Superintendent Hart Emery Wheel Co.,
Park St. South.
- 1880 Campbell, P. S., M. A., Principal Collegiate Institute, King
St. East.
- 1880 Cummings, Jas., Collector of Taxes, Ex-Chairman Board of
Education, City Hall.
- 1880 Chittenden, C. S., D. D. S., 69 Bay St. South.
- 1881 Currell, J. G., Barrister, 140 Cannon St. East.
- 1880 c 3 Charlton, B. E., President Hamilton Vinegar Works Co.,
58 John N.
- 1885 Chapman, Chas., Herkimer St.
- 1884 Carson, Rev. W. W.
- 1884 c Childs, W. A., 56 Bay St. South.
- 1880 Clark, J. A., Druggist, Jackson Street West.
- 1884 Carmichael, Rev. Hartley.
- 1872 c 2 Dickson, Geo., M. A., Principal, Upper Canada College.
- 1880 Duggan, R. J., Solicitor, Jackson St. West.
- 1881 De Brissav, Rev. L., M. A., Rector All Saints Church,
126 Market St.
- 1880 Dillabough, E. H., M. D., 18 Gore St.
- 1882 Dalley, F. F., Druggist, 99 James Street North.
- 1881 Evans, J. DeVile, 121 Bay St. North.
- 1882 Edwards, W. A., Architect, 142 Hunter St. East.
- 1870 c 2 Freed, A. T., Editor Spectator, 14 Hannah St. West.
- 1880 Forbes, A. F., Stock Broker, 2 Merrick St.
- 1880 Fletcher, Rev. D. H., 58 McNab St. South.
- 1880 Foster, W. C., Artist, 42 Hunter St. W.
- 1880 Foster, Charles, Food Inspector, 44 George St.
- 1881 Fearman, F. W., Chairman Board of Education, 58 Stin-
son Street.
- 1880 Fairgrieve, Hugh, Consulting Engineer, 40 Market St.
- 1882 c Field, G. W., M.A., Barrister, Elora.
- 1880 Findlay, W. F., Accountant, 132 John St. South.
- 1882 Ferres, James, Hardware, 78 James St. South.
- 1885 Garland, Louis, Druggist, King St. East.
- 1880 Gaviller, Alex., 21 Herkimer St.
- 1882 Gaviller, E. A., M.D., 8 Park St. South.
- 1883 Grossman, Julius, Music, 22 West Avenue South.
- 1883 Gibson, J. M., M. A., LL. B., M. P. P., Lt. Col., Barrister,
102 Main St. West.

- 1885 Glyndon, Wm., James St. North.
 1880 c 2 Hinchliffe, R., Electric Engineer, 392 York St.
 1880 Husband, G. E., M. D., 75 Main St. West.
 1882 Harrison, C. W., M. A., W. F. College.
 1882 Hoodless, John, Furniture Manufacturer, 51 King St. West.
 1882 Hemming, G. E., Barton, City P. O.
 1882 Harris, W. J., 14 Market Sq.
 1883 Hillyer, E. S., M. D., 9 Main St. East.
 1884 Harvey, W. C., Wholesale Boots and Shoes, 3 Main St. West.
 1882 Jelfs, G. F., Barrister, Hannah St. West.
 1882 Jones, J. W., LL. B., Barrister, Hughson St. South.
 1882 c 3 Kennedy, Wm., Bank B. N. A.
 1882 King, F. W., 91 Elgin St.
 1880 Lemon, Charles, Barrister, Charles St.
 1880 Leitch, John, Central Iron Works.
 1880 c 2 Lyle, Rev. S., B. D., 20 Jackson St. West.
 1880 Littler, John,
 1880 Littlehales, Thos., Manager and Engineer, Hamilton Gas Light Co.
 1880 Leslie, Jas., M. D., 37 Main St. West.
 1857 Leggatt, M., Wholesale Hardware, 5 Duke St.
 1884 Lee, Lyman, Law Student.
 1882 Laidlaw, Rev. R. J., 85 Hughson St. South.
 1884 Lafferty, James, M. D.
 1884 Leitch, Andrew, Central Iron Works.
 1884 Lavery, W. J., Solicitor, 4 Main St. West.
 1884 Minty, F. C., Dunnville.
 1880 Muir, John, M. A., Barrister, 37 Duke St.
 1880 Moffat, J. Alston, Member of the Council of the Entomological Society of Canada.
 1880 Moodie, John, 16 King St. West.
 1881 c 2 Mockridge, Rev. C. H., M. A. D. D., Rector Christ Church.
 1857 Malloch, A. E., M. D., 70 James St. South, Examiner in Surgery, Toronto University.
 1882 Munro, A., Com. Traveller, City.
 1870 Mullen, J. A., M. D., Ex-President of the Dominion Medical and Surgical Society, 124 James St. North.

- 1870 Milne, Wm., Wine Merchant, Wentworth St. North.
 1882 Morris, H. H., Canadian Bank of Commerce.
 1883 Murton, J. W., Coal Merchant, East Hamilton.
 1884 Mason, J. J., Mayor of Hamilton, 63 Hunter St. West.
 1884 Murton, E. C., East Hamilton.
 1837 McIlwraith, Thomas, Superintendent for Ontario of the
 Ornithological Society of N. America, Cairn Brae, City.
 1880 McLean, W., Editor, Cornwall.
 1884 McLaren, Henry, James St. South.
 1880 McPhie, Donald, Sanitary Engineer, 57 East Ave. South.
 1870 McQuesten, I. B., M. A., Barrister, 4 Bold St.
 1880 Macdonald, John, D. M. D., President, Ex-President
 Ontario Medical Association, 10 Duke St.
 1884 McRae, Colin, 30 King St. West.
 1880 Neill, A. T., Secretary, Geological Section, HAMILTON
 ASSOCIATION, Canada Life Chambers.
 1885 Plank, John, Wood Merchant.
 1882 Postell, N., Hess St. North.
 1882 Powis, Alfred, Commission Merchant, Concession St.
 1883 Pearson, John, Accountant, 213 James St. North.
 1883 Philp, Wm., M. D. 56 Hess St.
 1880 Robinson, Alex., M. D., Fisherville.
 1880 Robertson, C., M.A., Classical Master, Collegiate Institute,
 40 Emerald St. North.
 1881 Ross, A. M., Painter, 68 Colborne St.
 1881 c Reynolds, T. W., M. D., 122½ James St. North.
 1880 c Ryall, I., M. D., Physician Board of Health, 71 Main St.
 East.
 1872 Roseburgh, J. W., M. D., 52 James St. South.
 1882 Robinson, W. A., 6 Hannah St. East, Hamilton.
 1883 Robertson, H. H., Barrister, Rannoch Lodge.
 1880 Sutherland, Angus, Grocer, 56 King St. West.
 1880 Scriven, P. L., Engraver, 111 Jackson St. West.
 1882 Stewart, Rev. J. W. A., M. A., 107 Main St. West.
 1885 Sinclair, J. H., Law Student, 23 Herkimer St.
 1884 Sinclair, J. S., County Judge.
 1882 Smith, Wm., 74 Catharine St. North.
 1872 Smith, J. H., Inspector of Schools, Ancaster.

- 1883 Stiff, James, 155 Park St North.
 1883 Slater, S., Treasurer Landed Banking and Loan Co.
 1880 Thomson, John, Cannon St. East.
 1880 Turnbull, W., City Assessor, Librarian, Hamilton Association, 10 Wilson St.
 1881 Tuckett, Geo. E., King St. West.
 1881 Tuckett, Geo. T., 35 Bay St. South.
 Vernon, Elias, M. D. James St. South.
 1857 c 3 Witton, H. B., H. M. Inspector of Canals, 12 Murray St. West.
 1881 Williams, J. M., jr., 59 Hughson St. North.
 1881 Wallace, J. M., M. D., Medical Superintendent, Asylum for the Insane.
 1884 Young, Wm., 45 Jackson St. West.

CORRESPONDING MEMBERS.

- 1881 Clark, Chas. K., M. D., Rockford Asylum, Kingston.
 1881 c Van Wagner, P. S., J. P.; Stoney Creek.
 1884 Bull, Rev. George A., M. A., Barton.
 1882 c Lawson, A., M. A., Geological Survey of Canada.
 1881 c Spencer, J. W., Ba. Sc., Ph. D., F. G. S., Columbia, Mo., U. S.
 1870 c 2 Wright, Prof. W. P., M. A. California.
 1871 c Seath, John, M. A., High School Inspector, St. Catharines.
 1885 Frood, T., Kincardine, Ont.

HONORARY MEMBERS.

- 1881 Grant, Lt.-Col., John St. South.
 1882 Macoun, John, M. A., Government Botanist and Naturalist, Geological Survey of Dominion of Canada.
 1885 Dawson, Sir J. William, F. R. S., F. G. S., F. R. S. C., Principal McGill College, Montreal.
 1885 Sanford, Fleming, C. E., C. M. G., Ottawa.
 1885 Wilson, D., L.L. D., Principal, University of Toronto.
 1885 Farmer, William, Engineer, New York.
 1885 Ormiston, Wm., D. D., New York.
 1885 Proudfoot, Vice-Chancellor.
 1885 Rae, John.
 1885 Hurlburt, J. B., M. A., L.L. D., Ottawa.

PROCEEDINGS
OF THE
Hamilton Association

SEASON 1884-1885.

FIRST MEETING.

Twenty-Seventh Year, Thursday, November 20th, 1884.

The President, Dr. Macdonald, in the chair.

Minutes of the annual meeting, on the 15th May, 1884, were read and approved.

The reports of the Geological Section and the Librarian were read and passed.

Notice of motion was given by Mr. Dickson that sections B and C be amalgamated.

New members elected: Henry McLaren and Dr. Lafferty:
Proposed: F. C. Minty and William Hancock.

The President then read his inaugural address, in which he reviewed the work of the Association during the past session, also making reference to the progress making in the scientific world and pointing out some of the ways in which the Association might be more useful to its members and to the citizens.

Mr. Dickson announced the papers secured for the coming session.

Donations to the museum were reported as follows:

Specimens of British granite, by Mr. James Stiff, from Messrs. Hurd & Roberts.

Assorted specimens of corundum, in a case, from Mr. Samuel Briggs.

Indian axe, fragments of Indian pottery, and specimens of flint arrowheads, from H. B. Witton.

It was moved by Mr. Dickson, seconded by Mr. Witton, and resolved that the following reviews and scientific magazines be subscribed for by the Association and placed on the Library table for the use of the members, viz. :

<i>The Contemporary Review.</i>	<i>The Edinburgh Review.</i>
<i>The Fortnightly.</i>	<i>Popular Science Monthly.</i>
<i>The Westminster.</i>	<i>Scientific American.</i>
<i>American Chemical Journal, and "Nature."</i>	

The meeting then adjourned to meet on the second Thursday of December.

SECOND MEETING.

Twenty-Seventh year, 11th December, 1884.

The President in the chair.

The minutes of last meeting read and approved of.

New members elected : F. C. Minty and William Hancock.

New members proposed : Honorary—William Farmer, and Drs. Ormiston, Rae, Herbert and Hurlburt, and Vice-Chancellor Proudfoot. Corresponding member : Rev. Geo. A. Bull, M. A.

Donations of geological specimens from Mr. Steele. Three volumes from Mr. Richard Brierley comprising the Report of the Exploration of the Country between Lake Superior and the Red River Settlement, and two volumes of Flora Historica, a poisoned Indian dagger from Mr. Large, and a specimen of Indian carving in stone used by Chief Brant as an inkstand, from Mrs. Green, of Burlington.

The Council reported as follows : That the Library be opened on the evenings of Monday, Tuesday, Wednesday and Friday from half-past seven to half-past nine o'clock. That the Druggists' Society have the use of the room on the 2nd and 4th Thursdays of the month at a rental of \$25 for twenty meetings, and \$2 per meeting over that number. That in view of the great number of papers offered for the present session, the Association meet fortnightly, and that the property of the Association be insured for five hundred dollars.

These recommendations of the Council were adopted with the exception of that referring to the opening of the library, which was laid over till next meeting.

On motion of Mr. Dickson, sections B and C were amalgamated.

Mr. Witton read a paper on "The Ancient Language and Literature of India."

THIRD MEETING.

Twenty-Seventh year, 2nd January, 1885.

The President in the chair.

The minutes of previous meeting, read and adopted.

The recommendation of the Council made at the previous meeting as to the opening of the Library and Museum with Messrs. Turnbull, Mockridge, Gaviller, Alexander and Dickson as attendants on the evenings named was adopted.

The payment of accounts amounting to \$165.85 was also authorized.

Mr. Witton reported the receipt from Prof. Selwyn of a section of a fossil sponge prepared as a microscopic object.

New members proposed : Rev. Hartley Carmichael and Messrs. Wm. Glyndon, Lyman Lee and Chas. Chapman.

The Corresponding Secretary reported the following books and pamphlets as having been received : "Annual Report of the Curator," and "Bulletin of the Museum of Comparative Zoology," from Harvard University. "Hasty Notes on Military Engineering in Europe," 1 vol ; "Alluvial Basin of the Mississippi River," 1 vol.; "Specimens from Borings, Alluvial Basin, Mississippi River ;" "Fortifications of To-day ;" "Building Stone ;" "Preservation of Timber," and other 14 volumes from the office of the Chief Engineer of the U. S. army.

Mr. Kennedy read a paper on "Commercial Transactions in Pre-Historic Times—The Bronze Age."

FOURTH MEETING.

Twenty-Seventh year, 5th February, 1885.

The President in the chair.

The minutes of last meeting read and approved.

New members elected : Rev. Hartley Carmichael, and Messrs. William Glyndon, Lyman Lee, Charles Chapman.

A donation of Indian relics to the Museum was reported from Mr. Gaviller, as also a copy of the "Blue Laws of Connecticut," a reprint of the original bearing date 1650, from Mr. Chas. Lemon.

Papers were read as follows: "The Early Greek Philosophy," by Rev. J. W. A. Stewart, M. A., and "The Great Land Slide on the Grand River," by Professor Spencer, read by Mr. Dickson.

FIFTH MEETING.

Twenty-Seventh year, 19th February, 1885.

The 1st Vice-President, H. B. Witton, in the chair.

The minutes were read and approved.

New member proposed : J. H. Sinclair.

The Corresponding Secretary reported the receipt of a valuable geological map of the Dominion, and a very large map of the western portion of the Dominion, from F. E. Kilvert, Esq., M. P.; also from Thomas Robertson, Esq., M. P., the following : various Guide Books giving complete information of the Northwest and other parts of the Dominion ; "Report of the Minister of Agriculture;" "Report of the Select Committee on Geological Survey;" "Report of the Standing Committee on Emigration and Colonization;" "Report on the Mineral Resources of the Dominion of Canada;" "Report on Canadian Archives;" "Comparative Vocabularies of the Indian Tribes of British Columbia;" "Physical Geography and Geology of the Dominion of Canada," by Professors Selwyn and Dawson ; "Appendix to Report of Minister of Agriculture," being reports of Australian Exhibitions." From the Bureau of Education, U. S., "Circulars of Information."

It was announced that the Association was now affiliated with the Royal Society of Canada.

Dr. Leslie read a paper on "The Germ Theory."

SIXTH MEETING.

Twenty-Seventh year, 5th March, 1885.

Mr. Charlton in the chair.

Minutes of the previous meeting were read and approved.

New member elected : J. H. Sinclair.

New members proposed : James L. Dunn and William Murray.

Dr. Hillyer read a paper on "Historical Medicine."

SEVENTH MEETING.

Twenty-Seventh year, 19th March, 1885.

The President in the chair.

The minutes of the previous meeting read and approved.

New members elected : J. L. Dunn and William Murray.

Rev. R. J. Laidlaw read a paper on "The Early Home, Separation and Reunion of the Ayran Family."

EIGHTH MEETING.

Twenty-Seventh year, 27th March, 1885.

The President in the Chair.

The minutes of the previous meeting were read and passed.

New member proposed : Louis Garland, druggist.

A donation of seven volumes of "Nature" was reported from W. H. Mills.

Dr. Chittenden then read his paper on "The Waters of Burlington Bay and the City Sewage."

NINTH MEETING.

Twenty-Seventh year, 2nd April, 1885.

H. B. Witton in the chair.

The minutes of previous meeting were read and confirmed.

New member elected : Louis Garland, druggist.

New member proposed : John Plant, wood merchant.

Mr. McIlwraith read a paper on "American Ornithology and the Birds of Ontario." Mr. McIlwraith announced that he purposed presenting the Association with a complete list of the birds of Canada, with a short description of each. This list will not only be a valuable addition to the library of the Association but to Canadian Ornithology.

TENTH MEETING.

16th April, 1885.

H. B. Witton in the chair.

The minutes of the previous meeting were read and approved.

New member elected : John Plant.

New members proposed : R. C. Burkholder, printer, and Dr. D. Wilson as honorary member.

A communication was read from James Hutchison, as executor of the late William Murray, Entomologist, conveying to the Association a case containing a miscellaneous collection of Natural History specimens, the gift of Mr. John Drake, Bay City, Michigan, legatee of the late Wm. Murray.

A paper on the "Physical Development of the Niagara Escarpment," by A. C. Lawson, of the Geological Survey of Canada, was read in his absence by the Secretary.

At the close of the reading of this paper, Thos. Frood, Esq., who was introduced by J. A. Barr, gave some interesting facts connected with the subject of the paper, as well as valuable information regarding the geological formation and mineral wealth of the northern part of the Province, gleaned by him from personal observation and research.

Mr Frood was proposed as a corresponding member.

Mr. Dickson then read a paper, the question "Is Language a test of race?"

ELEVENTH MEETING.

Thursday, 23rd April, 1885.

The President in the chair.

Minutes read and approved.

New members elected : R. C. Burkholder ; Thos. Frood as a

corresponding member, and Dr. Wilson, of Toronto, as an honorary member.

Mr. A. Moffat called the attention of the members of the Association to the Natural History Collection of the late Rev. Dr. Kemp, adding that it could be secured by the Association. It was moved that the Curator and Secretary, with Mr. Moffat, be a committee to attend to the matter, and take the necessary steps to secure Dr. Kemp's collection for the Association.

The Corresponding Secretary reported the receipt of the "Canadian Entomologist" for February; "The transactions of the Manchester Geological Society," and the "Pharmaceutical Journal of Great Britain."

Mr. Charlton read a paper on "The Pioneer Traders of the Northwest," in which he dealt principally with La Salle and Henri, two early traders and explorers.

It was stated by Mr. Witton that La Salle's house was still in existence near La Chine, and that a project was on foot to purchase the house and to hand it over to the Government for safe keeping and preservation.

Mr. Wm. Morgan, Chairman of the Board of Health, and John McMaster were proposed for membership.

TWELFTH MEETING.

Thursday, May 7th.

The chair was occupied by Richard Bull; the minutes of the previous meeting were read and approved.

The Committee appointed to see to the collection of Natural History specimens, offered to the Association by Mrs. Kemp, widow of the late Rev. Dr. Kemp, reported that they secured the same and had deposited them in one of the cases in the museum.

New members elected :—Messrs. Wm. Morgan and John McMaster.

New members proposed :—W. W. Buchanan, Editor.

Mr. S. Briggs then read a paper on "Psychology, Illusions, Apparitions and Dreams."

THIRTEENTH MEETING.

Thursday, May 14th, 1885.

H. B. Witton in the chair.

The minutes of the previous meeting were read and approved.

This being the date for the annual meeting it was on motion resolved to adjourn the annual meeting for a fortnight to May 28th.

The Corresponding Secretary reported that he had received letters from Mr. Bourinot, Secretary of the Royal Society of Canada, Thomas Robertson, Esq., M. P., and from Dr. Rae. That from Mr. Bourinot was in reference to the sending of a delegate to the annual meeting of the Royal Society, to be held in Ottawa. Mr. Robertson's communication related to the lost reports sent to this Association through the Department of Agriculture. Dr. Rae's letter conveyed his thanks for his election as an honorary member of our Association, and intimating his intention to donate to the Society from time to time, his first contribution being a circumpolar map.

W. W. Buchanan was elected a member of the Association, and Sir J. W. Dawson and Sanford Fleming, Esq., were proposed as honorary members, and Mr. T. P. Barrett, of Toronto, as an ordinary member.

Mr. Wm. Glyndon then read a paper on "The Race Identity of the Old and New Worlds."

FOURTEENTH MEETING.

Annual Meeting, 28th May, 1885.

The President, Dr. MacDonald, in the chair.

The minutes of the previous meeting were read and approved.

Sir J. William Dawson, F. R. S., F. G. S., F. R. S. C., Principal of Magill College, Montreal, and Sanford Fleming, C. S. C. M. G., Ottawa, were elected honorary members, and T. P. Barrett an ordinary member of the Association.

The Rev. Dr. Mockridge gave notice that he would at the next meeting of the Association, move that all past presidents, resident in the city, be members of the Council of the Association.

The secretary gave notice that at the next meeting he would

move that the night of meeting be changed from Thursday to Friday.

Mr. W. C. Childs then read a paper on "Early German Literature."

Mr. Bull, the treasurer, then read his financial statement, showing a balance on hand of \$51.39.

The election of officers for the ensuing year resulted as follows :

President—Rev. C. H. Mockridge, M. A., D. D.

1st Vice-President—Rev. Samuel Lyle, B. D.

2nd Vice-President—William Kennedy.

Corresponding Secretary—George Dickson, M. A.

Recording Secretary—A. Alexander.

Treasurer—Richard Bull.

Librarian and Curator—Alexander Gaviller.

Council—W. A. Robinson, Samuel Briggs, G. M. Barton,
I. Alston Moffat and A. F. Forbes.

A committee consisting of the Rev. Samuel Lyle, H. B. Witton, and the president-elect, Rev. Dr. Mockridge, with the council, was appointed to make enquiries regarding the G. W. R. employees' library, and report at next meeting.

The meeting then adjourned, to meet again in November.

HAMILTON ASSOCIATION

SESSION 1884-1885.

INAUGURAL ADDRESS.

BY JOHN D. MACDONALD, M.D., PRESIDENT.

For the fourth time I come before you by your election, your President, and more than on any former occasion I feel that it would have been well had it been your pleasure that the duty of addressing you had been laid upon some one else. Many older members would more worthily have filled the chair, and to such there belongs a greater claim to preside here at this time, than can be advanced on my behalf. Hitherto the Hamilton Association in its career has been a pretty faithful reflection of the struggling and somewhat uncertain fortunes of our city. This was nothing more than might be looked for. Those who formed the membership have not been men of realized fortunes, nor generally, if indeed at all, have they consisted of those who were settled and prominent business men in the place. For the most part they have been composed of men who were young, vigorous and aspiring, but who had not yet succeeded in securing for themselves a name or habitation satisfactory to their ambition. They seemed to have perceived that Hamilton was not a place of much advantage for those who desired to push their fortunes, and so, one after another, they disappeared from our city and our Association, leaving both lamenting the lack of those attractions here, which alone would have sufficed to have retained our friends with us. The elder members, consisting chiefly of a few professional men, were carried off by death, and so it came about not long ago that our society was in need of renovation. How that was effected, by the efforts of its members who remained, you know; you know also how it has been gradually reconstituting and strengthening itself, so that now its prospects of continued life and usefulness are

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brightening very greatly. Here it is that we have cause to regret that this address is not from the lips of one of those who have a personal knowledge of the society's past, and of such as were wont to take part in its proceedings. The present annual commencement marks an era in its existence, sufficiently distinct to be made the occasion for a retrospect of its history, and for calling to mind the names of those friends, many of them passed away, who initiated the society, and who continued it often under circumstances of difficulty and discouragement. I regret that this, which would be a pleasing duty, is one which cannot be efficiently undertaken by the present speaker. It has not been his privilege to have been so long an associate as that he would be justified in the presence of several who are present, in dealing with the persons and things connected with the Association in past times. Rather one will confine himself to the present, and point to the existing condition of the society, and to the results before us to-day of the efforts of those who are aiming at constituting it as an efficient institution. When we look around us to-night we are encouraged to say that the Hamilton Association bears good promise of permanency as well as efficiency. One very important condition of permanency we have succeeded in obtaining—we have localized ourselves. I am sure we cannot but feel satisfied with our accommodation. The possession of a room for the purposes of the Association was not only desirable for the comfort of the members, but it is necessary for the safe keeping of the many things with which, as a society, we should strive to surround ourselves; for example the museum, of which we have a very fair nucleus gathered together, as you have an opportunity of seeing. We have to thank many friends for donations for the museum, and especially may we express our obligations to one whom we may mention as our distinguished fellow citizen, Colonel Grant, for the many interesting geological specimens which he has presented to us. Some of us are aware that Colonel Grant in his searching among the Silurian rocks of our own neighborhood has made what is likely to be pronounced a very important discovery. He has had the kindness to present us with many specimens of flint, which have been found by him where, according to the knowledge of geologists, few or no flints were to be looked for. Those have been regarded as productions especially characteristic of the chalk formation of the mezozoic age, but Colonel Grant seems

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to have been able to place them much farther back in the age of the globe. The specimens presented to us are to be found in the Niagara rocks around us. They are, it is true, not of a size equal to that of those found in the chalk of a more recent age, but they are in very great numbers. So that it is apparent that there was in the Silurian seas no lack of material for the growth of sponge and for the accretion of flint.

We shall not venture to estimate the range of the facts pointed out by Colonel Grant. We venture to express a hope that our friend's name shall be associated with new light, cast by his endeavors, on the formation of flints and their relation to sponges, questions on which there is as yet some confusion among geologists.

We offer our hearty thanks to Colonel Grant for his donation, and our not less hearty congratulations on his successful pursuit of his favorite science, and on the untiring industry with which we have seen that pursuit carried on.

There are many other geological specimens of interest, which our friends of the geological section have been arranging in the several cases around us, as rapidly as the time at their command would allow. When they have finished their work and a full view is had of the shelves and cases, as they shall have left them, there can be no doubt but what our first thought shall be, how well those cases look, and our second, how much better would they look if there were many more fossils in them. I hope our young geologists will take care that this regretful reflection shall not be of long continuance. There are many reasons why they should be ardent and industrious, and to one pressing reason I shall advert by and by. In the meantime they need not be discouraged, as so many of us are liable to be, by the reflection that even if they do fall in with valuable fossils, they are sure to be tossed about and spoiled, or altogether lost during the many migrations of their owners, in this as yet half nomadic continent of ours. We would say and assure all friends, that let anything of reasonable value be found and brought to us, and we will at once agree to give it a place in which to lie, we shall take care of it, and we shall treat it in all respects as if it were our own. We have also a small collection of objects in natural history. We do not boast of it, but we welcome it as a beginning, and hope to see it from time to time increase. It will be more satisfactory, of

course, to obtain examples of the fauna of other lands, but it will be altogether an acceptable thing, if some of our friends would favor us with specimens of such birds and animals as are inhabitants of our own country. I may mention that the Association has not yet seen its way to the employment of a taxidermist. I hope I may be pardoned if I say that it seems to me, that the ignorance on the part of Canadians of the fauna of our own country is very great, and I am sure that a knowledge, more especially of our birds, would be very interesting and most useful. No doubt there are books on American ornithology, in which we might acquire all the knowledge we wish for, if we could afford to buy them, and had time to read them, but our society is intended especially for the use of busy men—who have not time to cast their eyes over a large expanse of literature, but who hoping that one here and one there may be able to concentrate his mind upon, and more or less master, one and another subject, have formed themselves into a co-operative company, so to speak, for the diffusion amongst us all of such knowledge as each may have succeeded in acquiring. It would be of very great service, both to ourselves and to the community, if a series of papers were given on the “Animated Nature of Canada,” and the interest of such papers would be to a very great degree enhanced, if when the paper was read, a stuffed specimen of the creature described could be taken from our shelves for illustration. It is necessary for human nature, if you would instruct it well, that there should be objective as well as subjective teaching. The eye is as useful an avenue, whereby to reach the mind, as the ear, and the learner finds it not only easy, but pleasant for him to give his attention when both eye and ear are in use. Let our friends then procure for us specimens of such birds as visit Canada, and of such animals, of convenient bulk of course, as permanently live here. The habits of those birds and animals are known only to a few. It may be in the power of this society to promote amongst us a moral and intellectual enjoyment, founded upon our sympathy with the humbler creatures around us, a sympathy which can only be obtained by an acquaintance with their tastes, their enjoyments, and their sufferings. Perhaps, also, some learned lecturer may arise in the midst of us, who shall be able to say something on the usefulness of the sparrow, and comfort our community a little with refer-

ence to the wisdom which has been exercised in promoting his too successful immigration. So far the sparrow is simply a standing reproach to all organized efforts to entice immigrants to our continent. It is hardly known how he came, yet here he is in swarms rather than in flocks or in flights, a quarrelsome, thievish, domineering, dirty, and withal perfectly useless little creature, not even affording food for homeless cats, for none can catch him. Any man of us who can show us the usefulness of this little bird, or who can point out a successful way to rid us of it, will, there can be little doubt, obtain as he will deserve, a great name among our men of science, and do credit to our society.

Another field open to our friends and members is that of entomology. You see on our walls one or two cases of insects, which have been collected by one of our members and presented to the society. This charming branch of natural history has been well and successfully cultivated, as many of us are aware, by fellow citizens of our own. Several very valuable collections of this nature must exist in the city, and if there were funds at the disposal of the council, these could not be better used than in procuring a few cases of insects, wherewith to adorn our walls and thereby to enlighten our minds as to the multitude of beautiful things which float around us both night and day, without being heeded by us. The extent of the branch of science which is here alluded to, we do not well conceive, perhaps we cannot conceive it, although we may express ourselves regarding it by words and by numbers. To all who have taste and leisure it offers a field of occupation which we may say is boundless, and where, on the authority of those who are cultivators of it, health and contentment are to be found.

Further we have some specimens which I suppose we range under the head of anthropology, and they are not so creditable to human kind. They show the fell and cruel purpose which is in man in all his states, from that of the lowest savagery to that of the highest cultivation. Lions and tigers and other unamiable animals are called by us *feræ naturæ*, yet we do not know that lions and tigers deliberately and of malice aforethought make preparations for each others' destruction. It is supposed that when those creatures meet, as sometimes

they must, their procedure towards each other may be of the same complimentary description as that which is observed by the smaller tigers who have their meetings in our back yards, and there make known to one another the state of there minds. But such encounters are unpremeditated—there is no laborious preparation for them. It is reserved for man to nourish murder in his heart, and we have on our tables evidences of the complacency with which he contemplates the destruction of his kind, and prepares himself with means to accomplish it. Here are portentous clubs which we can easily see would be terribly efficient in a savage onslaught. With those there is no respects for parts any more than for persons, they are intended to crush wheresoever they strike. Besides them there are also lighter weapons, made of hard and heavy wood, but not too hard, we have been told, for their proposed use. These are thought suited for contact with the heads of adversaries. Other instruments there are also, all showing a bent for mischief, but exhibiting in all, savage as they are, an excellent power of adaptation of means to end, and extraordinary taste and artistic power. Amongst our collection of these things we have the boomerang, an evidence of ingenuity which has astonished all men, manifested as it has been by a people in the very lowest state of savage life, and by them only. I think that in the contemplation of those articles, which we may very properly call “reliques of a pre-historic age,” we have some comfort for those who when they witness the destruction of ornamented old buildings, are greatly distressed lest with them art should perish also. There seems to be no cause to fear for art. Taste may be in danger, because thoughts and habits may become corrupt, but art will always be at hand to minister adornment to whatever may be for the time the prevailing ideal. If true art springs from just thoughts and pure manners, no doubt it will always appear, that it may give to those expression. In the instances before us, we see it afford its sanction to the most blood curdling conceptions.

Lastly, we come to our library. By donation and purchase we have procured a fair commencement, and it will be the duty of our library committee by a judicious selection of new books, to make a good use of whatever funds they may have the good fortune to obtain. I am sorry that I cannot point to any source of needed funds just at present. No intimations have reached us lately from our

politicians or financiers as to whether there exists a glut of gold or the opposite. There are several among the older amongst us who have often heard at one time of glut, and at another time of scarcity, but never have we heard of a sufficient and equal distribution of this means of supplying men's desires. The poor we always have with us, and there is a strong impression that they ever shall be, although there have been many and notable plans for procuring their disappearance. In the meantime the Hamilton Association is with us, and its treasury is not so full as it might be, hence its book shelves show much unoccupied space. To this we freely direct the attention of members, in the hope that the empty spaces shall be quickly filled.

But if our shelves are not full neither are they empty. Let no one refrain from adding a book under the impression that his donation may look singular for lack of company. It need not be said that donations will be gladly received. But for ourselves we must remember that the best and most needed works will most likely have to be of our own choosing, and therefore of our own buying, and no doubt we shall by degrees increase the number of our volumes in the usual way, to wit by exchange for something else of equal value.

We have to congratulate ourselves on having obtained recognition in a very pleasant acceptable way, from a most important quarter. The Government of our Province has been ever prompt to extend its countenance, and where possible its material aid to institutions similar to the Hamilton Association. It is doubtless persuaded that these institutions greatly tend to promote the well being of the community, both now and for the time to come, and we must see to it that the expectations which may have been formed with regard to us, are not disappointed.

A great ruler of the last century, whose aims, we believe, to have been beneficent, is reported to have had as one of his maxims, "everything for the people, but nothing by the people." In our day we see reason to take exception to this dictum. We have, nearly all of us, become convinced from our observation and experience that if government is not "by the people" it will not be "for the people;" that, with government as with all other business, there is the greatest safety in its being cared for by those who have their interests in its proper administration.

In Ontario our political institutions are thus controlled, and they have been directed not solely to the end of ruling those who live under them, but also to the greatly more important and far reaching purpose of causing in them the improvements of all those faculties which distinguish reasoning and responsible beings. It is needful that among the people of Ontario there should exist much mental cultivation much and many-sided intellectual activity and a much greater amount and variety of information than we dare to claim as existing, even among those who are our social and commercial chief men. We seem to have left school too soon. We are good writers and expert figurers in no small proportion, but there is certainly something wanting for the enlargement of the mind, for the continuance of the education of a people with responsibilities so great as those which surround the people of this province. The want is in some measure supplied by the mutual helpfulness manifested in the working of such Associations as our own.

It must be our endeavor to prove ourselves worthy of the confidence manifested by the Government in our work, and it becomes us to express our thankfulness for its generosity. We can best do so, if we remember the reasonable conditions on which we may be sure that we have obtained its aid. Those who have bestowed this aid have a perfect realization that they are stewards, and they expect, when rendering an account to those whose ministers they are, that they shall be able to show a just balance on the credit side of our account with them. If it be otherwise, it is more than possible that the loss shall be at once written off, and the books closed against us for the time to come. So our candle may be put out.

It will be perceived that, in what has been said, no reference has been made to an event of the year which has been thought to be of great significance to Canada. I mean the meeting in Montreal of the British Association. Both the British Association and Canada owe thanks to him who was chiefly instrumental in bringing this about. The Association more than Canada lies under this obligation. Many of late years have been thinking that it would be a good thing for it to travel and see the world, and we may be sure that if it was as easy for it to visit the other scenes of its speculations as it is to visit America, many a discussion which has occupied the Association would never have been heard of. We welcomed our

fellow countrymen from the other shore, we are glad to know that they had a pleasant and a profitable meeting, and that they found here men like-minded with themselves, in whose companionship they found enjoyment. As for Canada, there need be no fear, but she will have her scientific men too; already our educational institutions are bearing fruit in this way, and if we have not yet very prominent in the midst of us those who love what is uncertain and speculative in science, we have not a few laborious men who are striving after the knowledge of what is well founded and exact, and from their work the country which is favored with their presence shall no doubt, in time, derive great profits, and as much praise as it deserves.

ON BIRDS AND BIRD MATTERS.

BY THOS. MCILWRAITH.

Although the subjects brought before the Association during the present session have been both numerous and varied, it is somewhat remarkable that no branch of the animal kingdom has yet come up for consideration. With the view of introducing this department of Natural History, and thinking that it might be a pleasing change for you to pass from the consideration of sewage and other unsavory, though all-important subjects, which have recently engaged your attention, I have availed myself of the opportunity offered, of asking you to spend an hour with me among the birds. The subject is a very attractive one, the objects which it embraces being always near us, varied in form, beautiful in color, and possessed of the most wonderful instincts, to mark the exercise of which is a continual source of delight.

A treatise on Ornithology, in the highest meaning of the term, is beyond the scope of this paper, as it would require us to go back half-way through the geological periods, where we would find the early forms of bird life very different from those we see around us at present.

It is not my purpose to follow the subject in this direction, nor to attempt giving you a highly scientific dissertation, made unintelligible by the use of unpronounceable technicalities. I would much

prefer taking a cursory glance at what has been written about American birds from the date of the earliest records we have on the subject up to the present time,—calling your attention to a few of the more remarkable species found near this city; and leaving with the Association a list of all the birds which have been observed *in Ontario*, with special reference to those found in our near neighborhood. This list, I hope, may be useful to the rising generation of Ornithologists, serving as time rolls on, to show by comparison what changes take place in the number and distribution of the different species. So long ago as 1860 I read a similar paper, and presented to this Association a similar list, which subsequently appeared in the *Canadian Journal* for that year; but so many changes have, since that time, been made in the nomenclature, and in the arrangement of the different groups, that we would not now be able to recognize the birds by the names then given them. These frequent changes have been a constant source of annoyance to the student, who, after getting fairly familiar with the system, and having occasion to leave it for a short time, may find on his return that he will have to begin all over again and learn to recognize his old friends by new names—an experience which is certainly very discouraging, and yet when we consider how these changes are brought about it seems hardly possible for the present to avoid the difficulty.

To such as have given even a limited amount of attention to the subject, it will be apparent that among birds there exist certain natural groups or families, the members of which are related to each other. Classification undertakes to separate and set apart each of those groups by itself, under a special family name, and did we know all the birds in existence, and in what ways they resemble each other, and in what ways they differ, the work would be comparatively easy; but unfortunately, here as elsewhere, human knowledge is incomplete, and the results are defective for want of proper data. Besides the difficulties arising from defective knowledge of the subject, it is evident that the arrangement of the groups can be carried out in different ways, as viewed from different standpoints: One may take as the basis of his system the formation of the bill and feet, while another, ignoring these points, may class together only such birds as resemble each other in their anatomical structure,

and each of these systematists having his followers writing and publishing under the system they favor most, produce the confusion so much complained of.

The subject of classification is now under consideration by a committee of the most able living Ornithologists, and it is to be hoped that their labors will result in the arrangement of a system of universal application which will be practically permanent.

As regards American birds, there are at present two different lists of names before the public,—one by Dr. Elliot Coues, a most accomplished scholar and brilliant writer, and another by Mr. Robt. Ridgeway, the accurate, careful curator of the bird department of the Smithsonian Institution. Either of these might be quite sufficient were the other out of the way, but having *two* only leads to confusion.

In most of the older systems it was customary to place the birds of prey first on the list, in consideration of their great size and strength, the noble (?) eagle occupying a place in the foremost ranks; better acquaintance with these birds shows us, however, that they do not possess the noble qualities attributed to them, that they are slovenly and irregular in their habits, often gorging themselves with carrion, and remaining for days in a state of dozing stupidity till the calls of hunger again force them out in search of things new and old.

I think it was Professor Lilgeborg, of Upsala, who first advocated the view that the birds entitled to the highest rank should be those which are possessed of the greatest amount of nervous irritability, and have all bird-like peculiarities most fully developed. When we consider that these peculiarities include swimming on the water, hopping on the ground, perching on trees, hopping nimbly from branch to branch and making their presence known by their characteristic and melodious voices, we readily see the justice of giving the first place to the passeress, or perching birds, all of which have a much higher organization than the birds of prey. This arrangement is adopted generally by both Dr. Coues and Mr. Ridgeway, yet they differ slightly in detail, one giving the first place to our familiar garden songster, the Robin, and the other to the Wood Thrush, a handsome bird of shy and retiring habits, seldom seen except in its favorite haunts in the bush. These and similar

differences occur all through the arrangements which we hope soon to see reconciled.

The birds of North America are understood to be all such as are found north of the Mexican border, and it is quite interesting to look back and observe at what rate the published record of species has increased, as well as the causes which have led to these results. No doubt many of the common species were observed by the early settlers in the country, and while raising their primitive homes with their minds still full of memories of the old land, finding a bird with a red breast coming familiarly near, he would naturally get the name of "Robin" after the familiar "Robin Redbreast" who was so much a favorite at home, but for some such circumstance our Robin might with greater propriety have been called the Red-breasted Thrush.

In these early days the hardy pioneers would have little time to devote to the study of the birds, and still less to record the result of such observation, but as the country became better known, and the facilities for reaching it were increased, travellers, adventurers, missionaries and others, made frequent visits from foreign countries, and as usual took home glowing accounts of the natural productions of the new land. Dr. Coues, who has made a careful search for records of this description gives in his new "Key to North American Birds" the names of quite a number of books published between the years 1600 and 1700, in which special reference is made to the birds of the districts visited by the writers. The Natural History of Carolina, Florida, etc., by Mark Catesby, published in parts, is the first in which any definite number of birds is mentioned. It was brought out in 1731, and by taking into account some additional species named in the appendix, the total number is brought up to 113.

In 1771, I. R. Forster published a tract entitled "A Catalogue of the Animals of North America," in which he mentions 302 birds, but they are not described, nor even named correctly.

In 1787, Pennant and Latham followed, the result of whose combined labors was the description of 500 species of American birds.

About this time Gmelin was busy compiling and transcribing the works of his predecessors, but he did not discover anything new

in the connection, and according to Dr. Coues, it is to Catesby, Edwards, Forster, Pennant, Latham and Bartram, that the credit belongs of making North American Ornithology what it was at this period.

The name of Bartram will always be respected from his connection with Wilson, yet Bartram himself was an advanced Ornithologist for the time, and published a list of the birds of the Eastern United States, naming many species as new, which, it is believed, were credited by subsequent authors to Wilson.

Prior to 1794 Alexander Wilson lived in his native town of Paisley, in Renfrewshire, Scotland, where he followed his father's steps as a hand-loom weaver. For a time he turned packman, but the venture was not a success. He had also corrected the Muses, and had written several pieces which were so well received as for a time to be attributed to Burns. In 1789, while carrying the pack, he added to his wares a prospectus of a volume of his poems, in which he said "if the *pedlar* should fail to be favored with sale, then I hope you'll encourage the *poet*." But he did not succeed in either capacity, and in 1794 he came to America, where he was once more a weaver, a pedlar, and a schoolmaster. It was here on the banks of the Schuylkill that he enjoyed the society of Bartram, which was no doubt instrumental in deciding his future course in life, and in all his troubles he received sympathy and encouragement from this venerable friend and ardent lover of nature. The period of Wilson's labors here was bright, but brief. The first volume of his work appeared in 1808, and he died in 1813, before the work was finished. With a cheap gun, hardly safe, with which to secure his specimens, and only common paper on which to trace his illustrations, he followed the subject with enthusiasm and perseverance which earned for him a reputation far ahead of all composers at the time ; even now he is regarded as the father of American Ornithology, and many of his descriptions of the birds are still quoted as the best which have appeared on the subject. After the untimely death of Wilson the work was carried on and completed by his associate Ovd, who brought out the eighth and ninth volumes in 1814. In this work about 280 species of birds were fully and faithfully described, and many of them shown in colored illustrations.

In 1824 Prince Lucien Bonaparte contributed to the *Journal* of the Philadelphia Academy, a series of critical articles on Wilson's American Ornithology. These referred chiefly to the nomenclature, a subject to which Wilson paid but little attention. During the ten years succeeding the above date, several editions of Wilson's work appeared, each containing the changes in the nomenclature suggested by Bonaparte, and having descriptions of such new species as had from time to time been brought to light. Bonaparte's principal work was his "American Ornithology," published in 1833, in which the number of species described was 366. In 1838 he published in London his "Geographical and Comparative List of the Birds of Europe and North America," in which the number of species was farther raised to 471. The Fauna Boreali-Americana was now in course of publication. The volume descriptive of the birds, which appeared in 1831, not only described many hitherto unknown species, but contained a vast amount of valuable information regarding the nests, eggs, and habits of the birds in their northern homes, about which little or nothing had been known.

In the meantime John James Audubon, a man of high culture, ample means, and a large amount of material to start with, was busy preparing his great work, the first volume of which appeared in 1827, but was not completed till 1839. The number of birds described was 506, nearly every species being shown in a colored illustration.

The attention of Ornithologists was now turned to the west, and a most valuable contribution was made to the subject by Mr. John Cassin, who published in 1856 a beautiful book entitled "Illustration of the Birds of California," illustrated with fifty colored plates.

In 1858 appeared the celebrated 9th volume of "Pacific Railroad Reports," which overturned the whole previous form of the subject. The number of specimens sent in by the different surveying parties was very great, and nearly all different species from those already known in the east. These, with the reports referring to them, were placed in the hands of Professor Baird, who with the assistance of Messrs. Cassin and Geo. N. Lawrence, revised the whole subject, and introducing for the sake of comparison the eastern species already known, made the volume a complete

exposition of all that was known up to that time of the birds of America, north of Mexico, and bringing up the list of described species to 744.

In 1874 Dr. Coues, then a surgeon in the U. S. Army, published a check list, which included such additional species as had been added since the former date, bringing up the number to 778.

In 1880 Mr. Ridgeway, in making out a catalogue of the specimens in the Smithsonian Institute labelled as North American, found that they numbered 924, but it is thought that many were thus included which were collected beyond the limits.

In 1882 Dr. Coues published a second edition of his check list, in which the number is increased to 888, and in his new key published in 1884, the number is reduced to 878. So the numbers stand at present, and as we do not now expect to have many new species added, any change which takes place will probably be a reduction, caused by condensing the groups which many think are at present too much divided.

Nothing of late years has happened so well calculated to advance the interest of this subject, as the result of a meeting which was held in the Museum of Natural History, in the Central Park, New York, in September, 1883. The meeting, which was called by circular, was composed of a few of the leading amateur and professional Ornithologists of North America. There were present one from Ontario, one from New Brunswick, and about twenty from different States in the Union. The meeting was a most enjoyable one, as it brought together many who were known to each other by correspondence, and yet had never personally met. It remained in session for three days, with Dr. Coues as Chairman, and Mr. E. P. Bicknell as Secretary. The proceedings resulted in the formation of an American Ornithologist's Union, now familiarly known as the A. O. U., with a constitution and by-laws similar to those of the British association of similar name. Professor I. A. Allen, of Cambridge, Mass., was elected President, and Dr. C. H. Merriam, of Locust Grove, N. Y., Secretary. Committees were formed to report on the following subjects at next meeting:—Nomenclature and Classification, Migration, Osteology, on the desirability or otherwise of encouraging the English Sparrow, and Distribution of Species. At the close it was decided, in consider-

ation of the importance of the proceedings and of the enjoyment they had afforded, to have all those present photographed in a group, which was subsequently carried out successfully by Bogardus, of Broadway.

At the *second* meeting of the Union, held in the same place in September, 1884, the committee on Nomenclature reported progress, but had not yet completed their labors. The hope was expressed that by next September a system of classification and nomenclature will be agreed on, which will be practically permanent, and save the annoyance arising from the frequent changes already referred to.

The committee on the desirability or otherwise of encouraging the English Sparrow, reported that they had taken evidence on the subject from every State where he was located, and the vote was almost unanimously against him ; but he is here now, and the committee taking a merciful view of his case, did not at present recommend any violent measures for his extinction, but suggest that no more houses be put up for the accommodation of the birds, that those who have been in the habit of affording them food and shelter should discontinue doing so, and that in all States where they have not yet appeared every means should be used to keep them out. If thus left to themselves for a few years, it would be seen whether the severity of the climate or other causes would be sufficient to keep them within proper bounds ; if not, an aggressive movement could then be made against them.

On behalf of the committee on Migration, Dr. Merriam reported that on taking office as Chairman, he had at once issued circulars calling for observers to note and report on the movements of the birds during the season of migration, and that he had now nearly 700 at different points in the States and Canada ; besides which every lighthouse keeper in both countries had instruction from their departments to furnish a record of all birds destroyed by flying against the glass at night, with the date and name of birds so killed as far as possible,

The amount of information furnished on these subjects was so great that the Chairman found it impossible to present it in proper shape without the use of maps, which he hoped within a short time to be able to supply. He presented an abstract from the reports referring to the movements of one or two representative birds from the time they crossed the southern boundary till they reached their

northern limits. But the most interesting facts relating to the subject were brought forward to show the great destruction which takes place among the birds by flying against the lighthouses. It is known that migrations take place mostly during the night, the day being spent seeking rest and refreshment. The smaller birds do not like to cross the lakes, but are found in great numbers flitting along the shores, or following the course of the larger rivers, the Mississippi valley in this way becoming the great highway of the travellers during the season of migration. By looking at the map of the State of Michigan it will be observed that northern bound birds entering that State from the south, find themselves hemmed in between lakes Huron and Michigan, and naturally gather into a *cul de sac* to cross at the straits of Mackinac, which they no doubt do in vast numbers. "In Lake Huron, at the eastern end of the straits, and midway between the shores, lies Spectacle Reef, on which is erected a lighthouse eighty-six feet above the water level. The light is of the second order, and shows alternately a red and white flash every 29 seconds, which is seen in clear weather at a distance of sixteen and a half miles. The lighthouse is surrounded by a wooden platform 85 feet square. The keeper of the light, Mr. William Marshall, has been there seven years, and states that during the season of migration on misty and rainy nights large numbers of birds strike and are killed. On one morning he picked *one hundred and fifty* on the pier surrounding the tower, and thinks that ten times that number fall outside the platform into the water. A package of these which were forwarded for identification, showed them to be such birds as we are accustomed to see passing north during the spring. A similar report furnished by the keeper of the lighthouse at Sombrero Key, Florida Reefs, shows that as many as 200 sometimes strike during one night." The circulars of instructions and tabular forms are again in the hands of observers for the spring work of 1885, and farther south many entries have no doubt already been made. Profiting by the experience of last year, the work has now been better systematized, and more information will be gained with less trouble. In the course of a year or two we will no doubt be able to say where all the species spend the winter, when they leave their winter quarters for the north, at what rate they travel, and how far north they go ; but whether we will find out what excites within the birds the desire to migrate, and how they

are able to carry out these desires with such precision and regularity, is very doubtful.

Having thus reviewed the subject generally, if we turn our attention homeward we find that in an ornithological point of view Hamilton is favorably situated, its surroundings being such as will attract birds of all classes. In the country we find highly cultivated fields alternating with clumps of mixed bush and rocky gullies, while the bay, with its sandy shores and marshy inlets, provides ample food and shelter for the waders and swimmers. Here, too, we are favorably situated for observing the movements of the migratory armies in the spring, and have done so with results similar to those already described.

Pressing on toward the north through Ohio early in May, the birds meet the south shore of Lake Erie, and following its course crowd in perfect swarms along the Niagara River till they strike the shore of Lake Ontario at right angles. Here, most likely, a separation takes place, some following the line of the lake shore eastward, while the greater number most likely take the western route, and are seen flitting from bush to bush along the beach, where for a few days in May they almost rival the sandflies in number, and that is saying a good deal. That some attempt to cross the lake is evident from their frequently flying on board vessels which are passing up and down at that season, and the fact of these individuals being generally much exhausted, would imply that many fall short of the north shore and perish in the water. The spring of 1882 is memorable as one in which the birds on their northern journey received a severe and sudden check. On the 9th of May the season was unusually favorable, and the migratory wave was rolling along at its height, when a severe north-easter set in during the night accompanied with cold, drizzling, sleety rain. This forced the birds to descend from upper air and seek shelter wherever it could be found. In the morning my garden was full of warblers, all in their glowing nuptial dress, but dull and dragged, not knowing where to turn. I collected more rare specimens in my garden that morning than I ever did anywhere else in the same time. This would seem to be an unfortunate resting-place for the birds, but others fared quite as bad elsewhere, for when a little daughter of Mr. Smith, who keeps the Ocean House, went down to play by the lake shore in the morning, she returned in a few minutes with her

pinafore full of little dead birds which were being washed up from the lake all along the shore. In former years it was the custom with those who wished a collection of birds to have them mounted and placed in glass cases, but the mounting in very many instances failed to satisfy those who were familiar with the appearance of the birds in life ; besides which they took up too much room, and always suffered by transportation. This mode is now practiced mostly by public museums, where the specimens remain permanently and are under the care of a curator. The plan now followed by amateur collectors is to skin and preserve the specimen, filling out the skin with cotton to about the natural size so as to make the bird look as if newly killed. In this way they are kept in trays in a cabinet, where they are easy of access for measurement or examination, besides which, through the facilities offered for transportation by mail, an exchange of duplicates can at very small cost be made by collectors, residing at far distant points. On the table there are now brought together in this way specimens from Alaska to Texas, and from New Brunswick to California, as well as many intermediate points.

The month of May, above all others in the year, is the one enjoyed by collectors, the birds being now arrayed in their richest dress, and excursions to the woods in pursuit of them offering so pleasing a change after our long, hard winter has passed away. There is no group of our small birds so interesting as the Warblers, which, though they do not differ much in size, yet vary greatly in plumage, some of them such as the Blackburnian and Black and Yellow being exceedingly beautiful, while others are so extremely rare everywhere that the securing of one is an event of the season. Among the latter class I may name the Cape May, of which I got two specimens at the Beach one morning in May, 1884.

The name of John Cassin has already been mentioned in this paper as a representative Ornithologist of his time. Hear what he says about the birds we are describing :—

“Bird collecting,” says Mr. Cassin, “is the ultimate refinement, the *ne plus ultra* of all the sports of the field. It is attended with all the excitement, and requires all the skill of other shooting with a much higher degree of theoretical information, and consequent gratification in its exercise. Personal activity (not necessarily to be exerted over so great a space as in game bird shooting, but in a

much greater diversity of locality), coolness, steadiness of hand, quickness of eye and of ear—especially the latter; in fact all the accomplishments of a first-rate shot will be of service, and some of them are indispensable to successful collecting. The main reliance, however, is on the ear for the detection of birds by their notes, and involves a knowledge the more accurate and discriminating the better, which can only be acquired by experience, and always characterizes the true woodsman, whether naturalist or hunter.

“This ability is of incomparable value to the collector, whether in the tangled forest, the deep recesses of the swamp, on the sea coast, or in the clear woodlands, on mountain or prairie; it advises him of whatever birds may be there, and affords him a higher gratification, announcing the presence of a bird he does not know. We recognize no more exquisite pleasure than to hear in the woods the note of a bird that is new to us. It is in the latter case that the cultivated quickness of the eye of the experienced collector is especially important, and his coolness and steadiness of nerve is fully tested. It will not do to be flustered. But, in fact, all these qualities must be possessed for the acquirement of the smaller species of birds found in our woods. Some species, such as the Warblers, are constantly in motion in the pursuit of insects, and are most frequently met with in the tops of trees; they are, moreover, only to be killed with the finest shot, or they are spoiled for specimens. The obtaining of these little birds always requires the most careful and skilful shooting.”

With us the Warblers arrive with remarkable regularity about the 10th of May. Should the season be a late one, they may be observed at this time gleaning their scanty fare among the almost leafless branches; or again, if early, the leaves may be opening out by the first of the month, yet the little birds do not appear till their regular time. As the first flocks arrive they rest and recruit for a day or two, and then pass on to make room for others who arrive and take their places. So the stream flows on till the Queen's birthday (May 24). About this time the Black Poll arrives, and when it goes the season may be considered over, as it is always the last of this class to arrive in spring. Thrushes, Orioles, Tangers and Flycatchers are now all here in full life, and the busy collector can hardly spare time to sleep—if he does, it is to see flocks of desirable species arise before his excited vision, and not till the

middle of June, when the birds are all nesting, does he lay aside the gun and take time to count his treasures.

The Sparrows, as a class, are also well represented near the city. Some of them, such as the Fox Colored, White Crowned and White Throated, being very handsome birds which visit us in Spring and Fall, but do not remain during the summer or winter, the best known of this class being the English Sparrow, which has been looked upon as an outsider, yet it is here now for good (or bad, as the case may be), and is entitled to a place among the others of its class. In all lists of American birds at present it is very unpopular, the principal charges brought against it being that of eating the fruit buds and driving away our native birds. Some time ago I gave the result of my observations, which appeared elsewhere, but may be worth repeating here:—It was in the summer of 1874 that I first noticed a pair of these birds about the out houses, and in a few days they became quite familiar, having evidently made up their minds to stay with us. I made them welcome for old acquaintance sake, and thinking they would make good settlers was about to put up a house for them, but before my well-meant intentions were carried out it became apparent that they were providing for themselves in a manner quite characteristic.

On a peak of the stable was a box occupied by a pair of swallows who were at this time engaged in rearing their young, and of this box the sparrows seemed determined to get possession. The swallows resisted their attacks with great spirit, and, their outcries bringing a host of friends to their assistance, the intruders were for a time driven off, but it was only to return again with renewed energy and perseverance. The swallows were now sorely beset, as one had to remain on guard while the other went in search of supplies. Still they managed to hold the fort till the enemy, watching his opportunity, made a strategic movement from the rear and darted into the box quicker than I can tell it. He emerged again with a callow swallow hanging by the nape of the neck in his bill and dropped it on the ground below, and soon another followed amid the distressing cries of the swallows who, seeing their hopes so completely blighted, sat mute and mournful on the ridge of the house for a short time, and then went away from the place, leaving the sparrows in undisputed possession of the box, and there they remained and raised some young ones during the summer.

In the spring of the following year the numbers had increased, and they began to roost under the veranda round the house, which brought frequent complaints from the sanitary department, and a protest was made against their being allowed to lodge there at all. Still, in view of the prospective riddance of insect pests from the garden, matters were arranged with the least possible disturbance to the birds, and we even stood by and saw them dislodge a pair of house wrens who had for years been in possession of a box fixed for them in an apple tree in the garden. So the second year wore on, no further notice being taken of the sparrows except that they were getting more numerous.

I had missed the sprightly song and lively manners of the wrens, and in the spring when they came round again seeking admission to their old home, I killed the sparrows which were in possession in order to give the wrens a chance, and they at once took advantage of it and commenced to carry up sticks in their usual industrious manner. They had only enjoyed possession for two days, however, when they were again dislodged. Again the intruders were killed off, and domestic felicity reigned for three days, when a third pair of sparrows came along bent on the same object, and, if possible, more overbearing and determined than their predecessors. This time I thought of a different mode of accomplishing the object in view, and taking down the box at night, nailed a shingle over the end and worked it flush round the edges ; with a centre bit a hole was then pierced just large enough to admit the wrens, but too small for the sparrows, and the box was put back in its place. Early in the morning the assault was renewed, but the wrens found at once that they were masters of the situation, and never were two birds more delighted. From his perch aloft the male poured forth torrents of scorn and ridicule, while the female inside the box fairly danced with delight, and I almost fancied was making faces at their enemy as he struggled ineffectually to gain admission, or sullenly, but fruitlessly, tried to widen the aperture.

Shortly after this dispute was settled I noticed ten or twelve sparrows quietly at work at the grape vines, and feeling pleased at the havoc they were apparently making among the insects passed on, speculating mentally on the probable increase of fruit I would have. In the afternoon they had moved to another trellis, and I thought "Well, they are doing the work systematically, and no

doubt effectually." But shortly afterwards, while passing the trellis where they commenced, a slight *debris* of greenery was observed along under the vines. This led to an examination which showed, to my intense mortification, that the heart had been eaten out of every fruit bud where the birds had been, and nothing left but the outside leaves. The report of firearms was heard several times in the garden that afternoon; many dead and wounded sparrows were left to the care of the cats, and every crevice where the birds were known to breed closed up at once.

Since then the wrens have kept possession of their box, and with a little attention I can keep the sparrows out of the garden, as they find plenty of provender round the stables; but they are still on the increase, and if this continues in the future as in the past, the time is not far distant when the streets and stable yards will not furnish food enough for the increased numbers, and there is no question but they will then betake themselves to the fields and gardens and take whatever suits them. This is the serious view of the subject which has called for legislation in other countries, and may do so here unless some unexpected check arises to prevent the necessity for it.

In the meantime it is well that all parties having opportunity should take notes of the movements and increase of the birds for future consideration.

One of our most showy birds, and one which seems to enjoy the society of man is the Baltimore Oriole, whose clear, flute like notes are usually heard round our dwelling for the first time in spring about the 8th of May, soon after which the curious purse-like nest may be observed suspended from the slender twigs of a neighboring tree. There are seven different species of orioles peculiar to North America, all of them very handsome birds, and having a general family likeness. Hitherto we have only had the one species with us, but in the spring of 1883 I found that several pairs of the Orchard Orioles were breeding at different points around the city. I was in hopes that this addition to our garden birds would be permanent, but last year not one was noticed. The orchard oriole is the smaller bird of the two, and where the Baltimore is orange, the present species is rich chestnut brown.

Another showy, dashing, familiar bird is the Blue Jay—better known round the farm home than near the city. He is a gay,

rollicking fellow, always ready for plunder or mischief. The greater number move south at the approach of winter, but a few remain in the pine woods, whence they issue on mild days to sun themselves among the tree tops. They are somewhat gregarious in their habits, and even in the breeding season have a custom of going round in guerilla bands of four or five, visiting the farm house in the early morning seeking a chance to suck eggs, and woe betide the unlucky owl whom they happen to come across on any of these excursions ; his peace for that day is done, as the excitement is often kept up till darkness forces the Jays to retire.

There is another Jay peculiar to Canada which is not found so far south as Hamilton. This is the Canada Jay, a constant hanger on round the lumber camps, where he picks up bits of meat or other refuse of the table. His taste for *raw* meat is so well known that the lumbermen have given him the name of "Butcher's Boy," "Meat Bird," etc. He is very common in the District of Muskoka, which is his southern limit in this part of the country. This species is strictly confined to the north, and has the singular habit of building its nest during the winter and raising its young as early as March, while the ground is still covered with snow. There are eighteen different Jays described as North American, but the greater number of these are found on the Pacific coast.

The Woodpeckers, as a class, move off before the advance of civilization, and as the country becomes cleared of heavy timber very few are seen. In the district of Muskoka are tracts where the fire has gone through, leaving many large trees killed and going to decay. This is described by my correspondent, Mr. Tisdall, as a perfect paradise for woodpeckers. Here the large black Logcock is quite common, and the Arctic three-toed species are constant residents. The Raven is also frequently seen in this district, and during the winter I saw a fine specimen of the great Cinerous Owl, which was sent down to Hamilton from one of the villages. The owls are not a numerous family, but all those peculiar to the eastern part of the continent have been found near Hamilton, though some of them are of very rare occurrence, the most recent addition being the Barn Owl (*Strex Flammea*), a specimen of which was shot by young Mr. Reid, gardener, near the cemetery, in the spring of 1882. This harmless mouser is believed to be identical with the British bird of the same name, whose history is so strongly colored by super-

stition ;—poets and historians, ancient and modern, uniformly associating his name with evil. In the writings of Shakespeare frequent allusion is made to the owl as a bird of evil repute, thus, when speaking of the omens which preceded the death of Cæsar, it is said that “Yesterday the bird of night did sit even at noonday upon the market-place, hooting and shrieking,” And in that memorable midnight ride when Thomas Graham, a farmer of Shanter, was privileged to get a glimpse of the proceedings of a social science meeting of the moving spirits of the time, the poet Burns, in describing the farmer’s progress homeward, says that “Kirk allowa was drawin’ nigh whaur ghaists and hoolets nightly cry.”

In the rural districts of Scotland where superstition still lingers, the “hoolet” is regarded with aversion, and its visits to the farm house are looked upon as forerunners of disaster to the family. Its cry when heard at night is described as most appalling, and is often referred to in this way in the Literature of the country. Thus, in a song by Tannahill, the fellow townsman and brother poet of Wilson, the hero of the song is entreating admission to the chamber of his lady love, and in describing his uncomfortable position outside, mentions among other causes that the “cry o’ hoolets maks me erie.” I have listened attentively to the cry of this and other owls, but have not recognized anything so terrifying about them. Not long ago I heard the serenade of the Great Horned Owl down near Stoney Creek, under the mountain. It was loud and harsh, and struck me at the time as resembling more than anything else the neighing of a young colt. Such sounds, when heard unexpectedly at night in a lonely place, are not calculated to inspire courage in a breast already depressed with superstitious fear, but the effect produced must to a great extent depend on the train of thought passing through the mind of the hearer at the time, for though many a stalwart Scot has quailed at the cry of the “hoolet,” yet it is a matter of history that the sons of that romantic land, when roused to enthusiasm by similar sounds extorted from the national instrument, have performed deeds of personal valor which will live in song and story so long as poets and historians seek such themes.

In our new country we have no birds of evil omen, and the owl receives his proper place in science and literature. The poet Longfellow speaks of him as “a grave bird ; a monk who chants

midnight mass in the great temple of nature.' His visits to the farm house are well understood, and if followed by disaster it is usually to the poultry, or to the bird himself if the farmer's boys have the opportunity

Towards the little Screech Owl the feeling is quite different, When the weather gets severe he frequently takes up his quarters inside the barn, and remains there undisturbed till the weather softens in the spring, when he again betakes himself to the woods. During the day he sits on the crossbeams glowering at the people as they come and go, but at night is most active in the pursuit of mice. which at this season form his favorite fare.

There is no doubt that before the country was settled, the sheltered waters of Burlington Bay was a favorite resting place for the vast crowds of waterfowl which annually pass to and from their breeding places in the north, although now that the Beach is traversed by a railroad, along which trains pass daily at full speed, and the bay is constantly dotted with steam or sailing craft moving around for trade or pleasure, these visits are fewer and of shorter duration than in former years. Gulls, Grebes, Loons and Ducks in large flocks are still observed in spring and fall. In the still summer evenings the bumping sound of the Bittern is frequently heard coming up from the marsh, and the little Bittern is common enough in suitable places all round the bay.

Occasionally Swans and Geese are seen, most frequently in spring about the time the ice is breaking up, and in March, 1884, five white Pelicans spent a short time in the open water near the canal, but such visits are made only by birds who seem bewildered or exhausted by adverse winds, or foggy weather.

In the month of May the bay is visited by flocks of the Velvet Duck (*Melanatta Velvetina*). Their large size and jet black plumage make them conspicuous objects on the water in the bright sunny days of the early summer, yet, strange to say, they are not long here till individuals are noticed dead on the beach, and the number of such increases during their stay till I have counted as many as ten or a dozen in a walk of two miles along the shore. The birds are all in excellent condition, and I have heard no satisfactory cause assigned for the mortality which prevails among them. It seems to be confined to this species, and was first observed two or three years ago;—since that time it has been rather on the

increase. I have not heard of its occurrence elsewhere, which would imply that the birds die from the effects of something which they find in the bay. Whether the paper recently read by Dr. Chittenden on the evil effects of allowing the city sewers to empty themselves into its waters would throw any light on the subject, is a matter well worthy of consideration, for if there is anything being mixed with the water which causes death to the birds, it cannot be conducive to the health of the people.

I have thus glanced but lightly at the history of only a few of the many species of birds to be found around us, but should farther information be at any time wanted regarding any particular species, I have pleasure in referring to the list which will henceforth be in the library of the association, and I hope the time is not far distant when the library will not only contain the *names* of the birds, but preserved specimens of the *birds themselves* will be found within the cabinets in the museum.

EARLY GREEK PHILOSOPHY,

BY REV. J. W. A. STEWART, M. A.

In popular language a sharp distinction is not always made between Science and Philosophy, and as a matter of fact, the one is continually running into the other. Science seldom stops short with itself, but is always pressing on beyond its own domain and becoming transformed into Philosophy. Not many of the Scientists of our day can content themselves with being simply Scientists ; most of them seek to be Philosophers as well, and this is perfectly natural ; the mind being made to think, cannot well rest without a Philosophy of some kind. What then is the distinction between Science and Philosophy ? In a word Science has to do with *phenomena alone*, Philosophy has to do with *what lies behind the phenomena*. Science accepts "what is set before it and asks no questions," Philosophy pries into the ultimate grounds or principles of things. Science takes the facts as they are, studies them, ascertains their relations, discovers their laws of antecedence and consequence, systematizes them. Philosophy cannot rest here, but struggles to go deeper and find out more, to find out the ultimate truth as to that out of which these facts

or phenomena spring. Science accepts the magnificent drama of Nature just as it appears and is acted upon the stage for all to see, and studies it with untiring zeal. Philosophy is extremely anxious to get behind the scenes and to know precisely how this drama is produced. From this it will at once appear how natural it is for the Scientist to become the Philosopher, how impossible it is for the mind to rest in Science alone, for the simple reason that the mind will think.

The History of Philosophic Thought may be divided into two great periods, called respectively *ancient* and *modern* Philosophy. The first begins with Thales, 600 B. C. ; and in Socrates (born B. C. 469,) Plato (born B. C. 429) and Aristotle (born B. C. 385) attains its richest and loftiest growth. After these it lived on a somewhat vigorous, but on the whole a declining life for several centuries, till at last in the 4th and 5th centuries after Christ, with Neo-Platonism for its final form, antique thought gave up in exhaustion, Ancient Philosophy reached its dissolution.

Modern Philosophy had for its originator and father, the Frenchman, Descartes, born 1576. Already it has had three centuries of great fruitfulness, and as yet seems to be only in its prime. Long may it live !

Then between the dissolution of Ancient Philosophy, say in the 6th century, and the birth of Modern Philosophy, in the 16th century, we have an interim of just 1000 years. And what about this long intervening period of what is called *The Middle Ages* ? Was their no thinking, no activity of the human mind in all those thousand years ? No student of history, who is at the same time a truth-teller, will say that. The human mind was exceedingly active, and there are great immortal names to be found here also. It was not the absence of mental activity, but it was the direction in which this activity displayed itself, which shuts this long period out of the History of Philosophy. It was the period of what is known as *Scholasticism*, and indeed some authors do not shut it out of Philosophic History. Tennemann makes three great periods in this history. Between the Ancient and the Modern he inserts the second, or Mediæval, and gives due prominence to the disputes of the Nominalists and Realists, and to such names as Aquinas, Anselm and Abelard. Uberweg also, in his History of Philosophy, goes over all the ground of this period, knowing, however very well that it is not

Philosophy in the strict sense with which he is here dealing. Schwegler on the other hand disposes of the whole period in a single chapter of three pages. What then was the character of the thinking of this 1000 years, and why does the record of it not strictly belong to a History of Philosophy? The thinking of this period was all in the interest of dogmatic theology. The dogma was accepted as starting point and the effort was to show its rationality—to show up Theology in philosophic form, to make Plato and Aristotle subservient to the exposition of the dogmas of the church, to procure for these dogmas a scientific system,—this was the character of Scholasticism. We detract not one iota from the importance and necessity of all this, we simply say it is not Philosophy in the strict sense. The bringing together of dogma and reason may be a more important interest than that of pure Philosophy. But pure Philosophy must start with no dogma presupposed, by which it is to be controlled and in whose interest it is to work. Philosophy's only starting point is human consciousness, and from this it seeks to get at the underlying principle and explanation of man and of nature—not by any means an easy task. After 2,400 years, the end which Philosophy seeks still seems far away, the battle between Idealism and Materialism is still going on.

Coming then to *Early Greek Philosophy*, one may say that in early times there was really no Philosophy outside that of the Greeks. Whatever else may have been achieved, and certainly great things were achieved in the founding of Empires, in Architecture, in Poetry, in Religion, in many ways,—it is just as certain that prior to 600 B. C., man did no philosophic thinking. Up to this time he remained contented with the directly theological, or the purely mythical explanation of things. And indeed to this day, so far as the strictly oriental mind is concerned, it has never done anything of importance for Philosophy. Nor was there any native growth of this sort in mighty Rome. A few slips, especially of Epicureanism and Stoicism, were carried over from Greece and planted in Italy and grew fairly well, but no new elements were added to them; Rome originated nothing in this regard. Lucretius, Seneca, Cicero, may be called Philosophers, but hardly in as true a sense as Democritus, Plato and Aristotle. About two-thirds of a page suffices Schwegler wherein to dispose of Philosophy amongst the Romans.

Turn we then to the Greeks, and there we have three distinct periods : 1. The pre-Socratic Philosophy, beginning with Thales, and ending with the Sophists : 2. The period which includes the three great names of Socrates, Plato and Aristotle. 3. The post Aristotelian Philosophy, including Stoicism, Epicureanism, Scepticism, and ending with Neo-Platonism. These periods represent to us respectively, the origin and growth, the maturity and richness, and lastly the gradual decline of the efforts of Greek thought to solve the problems of nature and of mind. With the first of these periods we are now chiefly concerned.

For the present let the Sophists drop out of sight ; they form a distinct group by themselves, as we shall see hereafter. And if we drop them out of sight, then we can say that pre-Socratic Philosophy occupied itself almost entirely with one problem, viz. : How shall we explain Nature ? By Nature, is here meant the material world, that which is most palpable, which lies nearest to the eye. In this, its childhood, Philosophy concerned not itself with the problems of Mind or of Morals. Like a child it was occupied with that which lies without, which is perceived through the senses. As with the child, so with Philosophy, to look within, to make the human self, with its thoughts and its moral obligation, the subject of consideration, this was a process reserved for an after stage ; to bridge the gulf between Mind and Matter, Thought and Extension, of this it did not yet dream.

Nature first excited the spirit of inquiry. "Under its changeful forms, its multiplex phenomena, there must lie, it was thought, a first and permanent fundamental principle. What is this principle ? What, it was asked, is the primitive ground of things ?"

The first who attempted an answer to these questions was Thales, who flourished about 600 B. C., about the time of Jeremiah the prophet, of the fall of Jerusalem, of the commencement of the Captivity in Jewish History ; while Tarquinius Priscus occupied the throne, the fifth of the seven early kings of Rome, the history of all of whom is exceedingly uncertain ; while Cræsus was amassing his proverbial wealth, and while Solon was framing his code of laws for the Athenians, Thales, for his part, was trying to arrive at "the primitive ground of things." Philosophy was born, not in Athens, but amongst the Ionian colonists on the coast of Asia Minor, in the city of Miletus. We have three Ionians for our first group,

Thales, Anaximander, Anaximenes. They simply abstracted from the individual, the infinitely varied forms of natural phenomena, and tried to fix upon one basal material element as the the ground of all. Thales made the element *water*. "All comes from water, to water all returns." Anaximander spoke simply of a chaotic, primeval matter, infinite, indefinite. Anaximenes made *air* the original element. The value of these first efforts was of course simply zero, excepting that they were the first efforts at anything like philosophy. No parent despises the first efforts of his child at walking or speaking.

After the Ionian Hylicists, the next mode of thought is that of the Pythagoreans. Pythagoras of Samos, is said to have flourished between 540 and 600 B. C. If all is true that is said about him he was certainly a wonderful man, but the difficulty here is to separate the romantic from the historical. The process of abstraction was begun by the Ionians, but they stopped at some *material* basis, something which still had *quality*, which was yet sensuous. The Pythagoreans carried the abstracting process still further, and looked away entirely from the qualitative character of matter to its quantitative character, its quantitative measure and relations. They directed their thought, not to the material and sensuous, but to the form and order of things in space. Their *number theory* exalted the ideas of form, proportion, harmony, symmetry; they made these the fundamental things. The world, the soul, virtue, are all based on number, proportion. Hence "the music of the spheres." It is not easy to say exactly how much they meant by this.

And now abstraction is carried a step further yet. The Ionians still cling to quality; the Pythagoreans excluded quality and stopped at quantity; the Eleatics, who come next, abstracted from both quality and quantity, from all *suchness*, from all *dividedness* in space or time, and said, "Only pure being is." There is no such thing as becoming, distinction for this from that, division into parts. The one is, the many are not. All variety and change that appears is so much deception, only a seeming, it has no reality. All truth is told when you have spoken of pure being, one, immutable, all-embracing. The names here are, Xenophanes, Parmenideas of Elea (hence the Eleatic school), and Zeno, well known to us all by his puzzles or antinomies whereby he sought to demonstrate the absurdity and impossibility of the division of matter, or of movement in space.

Further abstraction is impossible ; the Ionians, the Pythagoreans, the Eleatics have exhausted this process.

But what about the world that appears with all its variety and movement ? The Eleatics may deny it, but here it is all the same. Zeno may demonstrate the absurdity of an arrow's flight, and the impossibility of the hare overtaking the tortoise, but all the same the arrow flies, and the hare wins the race. If only "pure being is," whence the phenomenal world ? Now enters Heraclitus of Ephesus, born 460 B. C., "the weeping philosopher" as he is called ; "the deepest of pre-Socratic philosophers, according to Schwegler ; and he reconciles being and non-being, the one and the many, by the principle of *Becoming*. "Nothing remains the same, all comes and goes, resolves itself and passes out into other forms, out of all comes all ; from life, death, from the dead, life ; there is everywhere and eternally only this one process of the alternation of birth and decay." If the Eleatics said that eyes and ears deceive when they tell of variety, change, Heraclitus said that they deceive when they tell of permanence. "In the same stream none ever bathed him twice." "Time is a child at its sport." "Life is the death of the gods, death is their life. These are some of his aphorisms. And so the Eleatic and Heracletic principles are the very antipodes of each other, the utter denial of all change on the one hand, the denial of anything but change on the other.

If the first efforts in Thales and Anaxamander seemed exceedingly infantile, is it not time now for us to acknowledge that the Greek Philosophic child is beginning to toddle along pretty well, if indeed he is not already able to run with the strongest and swiftest of us ?

How shall we reconcile Being and Becoming, Zeno and Heraclitus ? This is now the question, at which Empedocles of Agrigento tried his hand, and to the solution of which the Atomists also bent their energies. Empedocles, we will pass by, not however because he is unworthy of our notice. Coming then to the Atomists, the very word atom seems to carry us in a moment over 2,000 years, and set us down in the last quarter of the nineteenth century at the feet of some of our best known Physicists. And the resemblance between the Atomists of Ancient Greece and those of to-day is not simply in name ; their doctrines are in a large measure identical. Of the old Atomists, Democritus was the chief, and here is a paragraph

from Prof. Tyndall's famous Belfast address : "The principles enunciated by Democritus reveal his uncompromising antagonism to those who deduced the phenomena of nature from the caprices of the gods. They are briefly as follows :—1. From nothing comes nothing. Nothing that exists can be destroyed, all changes are due to the combination and separation of molecules. 2. Nothing happens by chance ; every occurrence has its cause from which it follows by necessity. 3. The only existing things are the atoms and empty space ; all else is man's opinion. 4. The atoms are infinite in number and infinitely various in form ; they strike together, and the lateral motions and whirling which thus arise are the beginnings of worlds. 5. The varieties of all things depend upon the varieties of their atoms, in number, size and aggregation. 6. The soul consists of free, smooth, round atoms, like those of fire. These are the most mobile of all. They enter and penetrate the whole body, and in their motions the phenomena of life arise. Then the atoms of Democritus are individually without sensation ; they combine in obedience to mechanical laws, and not only organic forms, but the phenomena of sensation and thought are also the result of their combination." Some one says that "The ancients have stolen all our best thoughts," and thus it is that at any rate Democritus stole a number of the thoughts of modern Material Philosophy. Owing to the remarkable harmony of their opinions we are not surprised that Prof. Tyndall seems in his address to elevate Democritus to a loftier eminence than he is willing to assign to Plato and Aristotle. There were other Atomists besides Democritus, but they need not engage us. Democritus was born about 460 B. C., travelled extensively, became the most learned man before Aristotle. Given space, the atoms in space, local alteration or mechanical movement of the atoms in space, this movement caused by a necessity springing from the nature of the atoms—out of these elements Democritus constructed the universe.

Anaxagoras, who first introduced Philosophy in Athens, which was henceforth for a long time to be its home, added to the notions of his predecessors the thought of "a world forming intelligence that was absolutely separated and free from matter, and that acted on design." It would be a mistake however, to suppose that Anaxagoras propounded anything like a theistic conception of the universe as that phrase is commonly understood. And so with Anaxagoras

there ended this first series of Philosophers who struggled in their own way with the problem which nature presents to every thoughtful mind.

The series has extended over nearly 200 years. There has been steady growth, each thought or system springing from, being conditioned by that which has gone before it. And the period is by no means wanting in permanent interest and value.

As to the Sophists, who came next, they should have a short paper to themselves alone. A single thought, however, may serve to indicate their position, and their wide difference from those whom we have considered. Up to this time it was all along taken for granted that our thought, subjective consciousness, is entirely determined by objective reality, by that which lies outside of us. Things without us are the source of our knowledge. Not so, said the Sophists; our thought is not determined by things outward, but things outward are determined by our thought. Hitherto the external object was everything and the thinking subject was totally submissive. Now the thinking subject is exalted and the external subject is almost sacrificed altogether. There is no absolute truth, no absolute good. That is true which is true to me, and false which is false to me. That is good which gratifies me, and evil which gives me displeasure, and so with every one else. Hence the same thing may be both true and false, good and evil, it all depends on the individual man. "The individual man is the measure of all things," so taught the Sophist Protagoras. It would be wrong, however, to condemn the Sophists as a set of quibblers. In some respects they rendered genuine service alike to the Athens of their day and to the progress of thought. And here must end this paper, already too long, much as we would wish to tarry until the unsightly figure and winning voice and relentless questioning and noble, earnest spirit of Socrates enter upon the scene.

REMARKABLE LANDSLIDE NEAR BRANTFORD, ONTARIO.

*BY J. W. SPENCER, B. A. Sc.; PH. D., F. G. S.

A gigantic landslide occurred on April 15th, 1884, at 6.45 p. m., along the right bluff of the Grand River, two miles south south-east of Brantford. During the short period of three or four minutes, a mass of quaternary deposits, measuring more than 300,000 cubic yards were involved in the physical changes.

In the vicinity of Brantford, the Grand River valley has a width of about two miles, with the river meandering from one side to the other, as its slope is there much less than above the city. Several miles farther down, the valley becomes contracted again. It is bounded by bluffs rising about 80 feet above the flood plains, with the river flowing ten or more feet below their level.

The lower and principal portion of the bluffs, at the landslide, is composed of Erie clay, while the upper beds are made up of the more sandy Saugeen clay of Canadian geologists. The underlying rocks belong to the higher series of the upper Silurian system, but these are exposed on the banks of the river, only above and below this wide alluvial plain, along which our landslide occurred. The structure of the Erie clay, as shown in the landslide, is much more distinct than is usually seen in the older exposures, where the vertical or oblique joints have been observed by weathering. The formation consists of a very hard drab (blue when wet) clay splitting into regular and thin slabs. The jointed structure is less apparent in the vertical walls, left standing, than in the fallen masses, where it is broken into pyramids, from a few feet to more than ten in height. It was from the slipping along these planes, and those of the natural bedding that the slide was produced.

The geological interest attached here is, that we can see : (1) The character of a slide which has not resulted from undermining action, but from hydrostatic pressure, in the ever opening joints, where the clay is constantly becoming softened. (2) The dynamical effect upon laterally confined plastic clay, below the horizon, to which the fallen masses could reach ; and (3), the manner in which the

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broad shallow valley has been excavated out of Pleistocene formations in recent days.

(1) As before stated, the bluff has an elevation of about 80 feet above the plain. The river itself flows from 150 to 300 feet distant from the brow or edge of the bluff, thus producing a more gentle slope than is ordinarily required for clay to withstand the mechanical action of weathering forces. The length of the slide is 700 feet, and the approximate width of the original surface fallen, is represented by a plot of ground 165 feet broad, in part, which for a length of 375 feet, has slidden bodily from the face of the bluff, for a distance of fifty feet or more, and sunken from 40 to 60 feet, without further disturbing its grassy surface and forest trees, other than by producing a large longitudinal pressure, and the tilting of the trees a few degrees towards the hillside, with the overthrow of some others. This plot is still about 70 feet distant from the river. At the eastern end, the slide graduates into a confused mass of pyramids of jointed clay, between which there are great fissures. These masses at the eastern end of the landslide, in place of quietly sinking down as at its western end, rolled in confusion from the side of the bluff, not only to the river channel, but 100 feet across it, thus temporarily producing a dam, which has subsequently been removed by the river. The cause of the landslide is evidently due to hydrostatic force, acting in the vertical joints, along which, and also along the planes of bedding, the clay was eventually softened, and produced slipping surfaces, which yielded to gravity and lateral pressure.

(2) Whilst beneath the hummocky mass, at the eastern end of the slide, the dynamical effects upon the lower beds of the more or less plastic clay, at the level of the river, are concealed; yet between the sunken plot of wooded ground and the river, which is about 70 feet distant, these are shown in a most interesting manner. Here we find that the beds of clay are pushed up vertically upon their edges, by a lateral thrust, and that the gravel of the present river, which occurs at only ten feet or more below the surface of the plain, is also lifted up from ten to fifteen feet. These vertical beds can be traced for some hundreds of feet longitudinally, and in some places they are more or less distorted. Thus we see in miniature, the phenomena of upheaval, and of deformation of great stratified masses. The dynamical forces here, have resulted from an enormous mass sliding sud-

denly down upon laterally confined plastic clay, with an oblique thrust of two or three thousand *foot-tons* per linear foot, of which probably one-third, converted into a longitudinal force, acting at some distance, has pushed up the beds of moistened clay upon their edges, and also bent them where the resistance was not great enough to withstand it. This vertical movement of the beds did not reach the opposite side of the river.

(3) Although landslides do not often exhibit so clearly the two interesting effects just described, smaller ones are everywhere of such frequent occurrence, that observations at Brantford, bearing upon the widening of the valley, are of purely local interest, and scarcely worthy of notice. Whilst the broad valley between the Quaternary bluffs, here, has been slowly produced by atmospheric and river action, it may be noted that there was an enlargement in the Silurian water before the deposition of the Pleistocene deposits, and we find some miles farther down the river, that the valley is much narrower and bounded frequently by limestones and other hard rocks, which were removed from the region of our landslide before the deposition of the Erie clay, which is not nearly so largely developed outside of Tertiary (or older) valleys of this part of the Province of Ontario.

BURLINGTON BAY AND THE CITY DRAINAGE.

BY C. S. CHITTENDEN.

Adjacent to our city, we have a beautiful sheet of water, of which we are all naturally quite proud. When away from home we speak of Burlington Bay as a something which we can boast of, and those who hear us speak of it, sometimes feel a little envious that they have not such a miniature lake as well as we. The long stretch of sandy beach, separating it from the lake, affords a charming drive for pleasure seekers, and at the same time forms a magnificent break-water, protecting yachting and boating parties from the long sweep of the winds and waves of the lake.

Burlington Bay, Mr. Charlton has told us, was discovered by three Sulpician missionaries, Gallinu, De Cassou and La Salle, in 1667,

who remained in the vicinity for some weeks. Mr. Kennedy, in his paper on the "Superficial Geology of the Dundas Valley," has told us that the bay forms the base of the triangle of which the Dundas Valley is formed, and he has almost made us believe that Lake Erie at one time discharged its waters through the Dundas Valley and Burlington Bay, and Mr. Van Wagner, treated us with his views on the formation of Burlington Beach.

Members of this Association have considered our bay of sufficient importance to occupy a part of three evenings in descriptions of it, or disquisitions upon it.

A fluent writer could say a great deal that would be extremely interesting about it, but as I am neither fluent nor capable of giving a description of its many beauties, I shall confine my remarks to the contents of the bay, and the water which flows into it, and out of it. There are several small streams running into it, but none of large size, and, all nearly or quite dry up during the summer.

The first is the Waterdown Creek which empties itself into the inlet on the Waterdown road. The next are the Dundas, Ancaster and Chedoke creeks which empty into the Dundas marsh, and reach the bay through Desjardines canal.

The last stream of any size at all is the Albion Mills creek, which discharges its water at the south-east angle of the bay, passing between the Hamilton Water Works pumping house and the filtering basin. These are the only means of supply, except what flows through the Burlington canal, which is also the only outlet of the bay. As we all know, during spring and fall these creeks convey a large amount of water, and at these seasons there must of necessity be a considerable current flowing out through the canal at the Beach, but during winter and summer there can be but little change in the water. It has been stated that there is always, and at all times, an outward current through the Burlington canal, which did not seem to me to be probable, and to settle the matter as far as possible, I wrote to Capt. Campbell, at Burlington Beach, asking him to give me the facts in the matter, and at the same time telling him that I was anxious to know whether there is a constant "undertow" flowing outward, even when there is a strong current flowing inward at the surface.

The following is Capt. Campbell's reply :

BURLINGTON CANAL, Dec. 29th 1884.

Dear Sir,—Yours of 23rd inst. is to hand. When the current is running in from the lake, or when wind is strong from the north-east, which has the effect of driving a large quantity of water from the lake, the water in the canal and in the neighborhood of the beach is considered pure and fit for use ; on the other hand, when the current is out and a south-west wind is blowing we do not pretend to use the water.

It is not true that there is an outward flow of water at the bottom of the canal, no matter which way the wind is ; the currents in the canal are controlled entirely by the winds. If the wind is strong from the north-east and a large body of water is forced into the bay, I have noticed that the water would rise eight or ten inches and remain so for perhaps three or four hours, then turn and run *out against* the wind, (but not the same quantity as at first came in), and then turn round and run in again, and keep acting in that way until the wind would moderate, thus the surplus water would run out and come to its natural stage. Again, when we have a strong wind from the westward the water will lower as above, and remain so until the weather moderates, then come into its natural level ; when there is a dead calm for any length of time, there is no current either way. Hoping the above will answer your enquiry,

I remain,

Yours respectfully,

THOS. CAMPBELL.

Now, if these small streams and the inflows through the canal are the only means of renewing the waters of the bay (except what falls from the sky), it seems as if there were need of taking great care that no more impure matter should be allowed to vitiate them than cannot be prevented. But what are the facts? Is the city doing that?

In 1854 the first sewer was completed,—down James street to the inlet near the Agricultural Implement Works—when the defilement commenced, and has been going on increasing as the sewers have been extended.

Quite recently the citizens were asked for a hundred and five thousand dollars with which to extend and repair the old, as well as to build new sewers, through which it was intended, presumably, that every citizen should be compelled to have his water closet empty into the bay, thus making what we have so justly been proud of for all these years, a grand cesspool. It has been maintained by some that the tossing and tumbling about of the water by the winds

would bring it all sufficiently in contact with the air to oxidize the organic compounds of the sewage, and render the water fully as free from contaminations as if no sewage had been permitted to mingle with it. It may be safely granted that under favorable circumstances such would be the case, but in so small a body of water as Burlington Bay the favorable circumstances do not exist. Lord oxygen is a powerful potentate, but like many other things, he can only do his very utmost, and the surface of the bay is altogether too small to permit him to cope with so large an enemy as the sewage of the city.

When it is remembered that the sewers of the city are, like many of the ducts leading from the glands of the animal economy, constantly discharging, it would seem to any one crossing the outlet at the foot of Cathcart street (as I did not long since) that the quantity of sewage flowing into the inlet at that point would be sufficient to poison a much larger body of water than our bay, even if the means of renewing its contents were much greater than they are. But, to satisfy myself as to the correctness of the position I have been contending for, and prove the falsity of the opinions regarding the oxidation of the organic substances, I sent two young gentlemen to the bay with eight clean quart bottles, with instructions to fill No. 1 off the Hess street sewer, midway between Bastien's boathouse and the western end of the railway pier; No. 2 off the Desjardine's canal; No. 3, midway between Bastien's and Rock Bay; No. 4, midway between Bastien's and the powder magazine wharf; No. 5, a half mile towards the Ocean House from the point from which No. 4 was taken; No. 6, a mile north from Murton's dock; No. 7, a mile east from No. 6, and No. 8 off the mouth of the Cathcart street sewer.

The day proved to be very cold, with a strong northeast wind blowing, so that only seven of the bottles were filled;—the young men became tired out with rowing and turned back without filling No. 7. Before sending out the bottles I laid my scheme before Mr. Dickson, who heartily approved of the project, and gave me all the assistance in his power (giving me the use of his appliances, as well as his time for several evenings), to enable me to get at the facts with regard to the quality of the water. My object was not to obtain a quantitative, but a comparative qualitative analysis of the water from different parts of the bay, and I think we have done so to a sufficient

extent to show that it is not a safe thing for the health of the city, that the excreta from 40,000 inhabitants should be poured into its waters.

Our first experiment was with the Permanganate test for organic compounds. In Nos. 1, 2 and 3 the test gave strong indications of their presence ; No. 4 gave still greater indications, while No. 5 appeared to contain more organic matter than all the four which we had tested ; No. 6 appeared to be the least contaminated, while No. 8 was like Nos. 1, 2 and 3. Our next test was for Nitrates, but it was nearly a fruitless search, as we found only a trace in No. 3. We then hunted for Chlorides, which was more successful, as we found a small quantity in each, but most in No. 5. We searched for Ammonia with Nessler's test, which, it is said, will detect one part in a million. This was, perhaps, the most perfect and interesting of any of the tests of which we made use. The presence of the smallest quantity of ammonia showing itself so very plainly and distinctly. Commencing with No. 1 again, we found that the quantity of ammonia in it was about the same as in Nos. 2 and 3, while No 4 showed an increase, and No. 5 gave a copious deposit of sediment of the distinguishing color produced by Nessler's test ; No. 6 gave only small indication of contamination, while No. 8 was in every respect like No. 1.

Having proceeded so far, we thought best to look for Sulphates, which we did with Barium Chloride. To my surprise there was very little to be found. I had expected to find a marked quantity of Calcium Sulphate, but it was not present, except in very minute quantities.

As the Permanganate test is of so delicate a nature, we thought best to employ two or three others. From a large number of thorough tests for Albumenoids, we selected Bi-chloride of Mercury and Lead Acetate. The results fully corroborated the result of the Permanganate test, so it is not necessary to recapitulate them. Having tested for organic compounds, for Chlorides, for Ammonia and for Sulphates, we arrived at the conclusion that the water, in that part of the bay from which it was taken, was decidedly impure. As a strong northeast wind was blowing at the time, it seems probable that the sewage may have been driven into the southwest angle of the bay, and the depth of water increased there, as Capt.

Campbell says it does at the Canal when the wind is in the same direction. It is possible that water taken at a distance of two or three miles to the northeast from the place from which No. 6 bottle was filled, would have been purer.

On making inquiries of one of the officials of the sewer department of the city, I found it was impossible to get at the exact number of families whose waterclosets connect with the sewers, but was told that from twenty-five to thirty-three per cent of them do. Now if ten thousand or thirteen thousand odd have rendered the water of the bay so vile as we have found it, what will it be when the whole forty thousand are compelled to connect their closets with the sewers? Kind friends have sent me books and pamphlets on the disposition of sewage,—some evidently good, some which seem to me to be utterly bad, and some that would, apparently, be perfectly effective. Mons. Berleix, of Paris, has invented a system which he calls Pneumatic, which, so far as I can see from the drawings and descriptions, is about perfect, but the expense would be very great. Mr. Geo. E. Waring designed a system for the city of Memphis, Tenn., which Mr. I. S. Gardner, of the New York State Board of Health, pronounces to be the “best plan yet devised.” It is called the Separate Sewage System, and consists of a set of pipes by which excreta, slops and waste water are removed, while storm water is provided with separate conduits of large dimensions, or led off on the surface to natural channels of outflow. By many the plan called intercepting is advocated. Have the advocates of this plan well considered the matter? Certainly, by the intercepting system there can be nothing removed from the water but the solid portions, which, when deprived of the water contained in them, would bear but a very small percentage of the whole, while the percentage of the fluid portions would be very great, and the saving of the solid portions only for manurial purposes would be like saving the husk and discarding the kernel. I quote from an article on “Sewage and Sewage Farming,” in *Nature*, which, I think, not only strengthens, but clinches the two points which I am contending for, viz: 1st, That water contaminated with sewage is not easily oxidized; and 2nd, That the intercepting plan does not by any means deprive the liquid portions of their manurial nor deleterious properties. The writer, Mr. Thos. Baldwin, in speaking of the sewage of Northampton, Eng., says:

“ After having had practical experience of the fertilizing effects of sewage and liquid manure, I have for several years devoted part of my leisure time to an examination of the arrangements adopted by the principal cities and towns for disposing of sewage. At first I looked at it from the agricultural standpoint, but as I proceeded with the inquiry I had to widen the range of view. The place I visited last was Northampton. I propose at present to write a concise note of what the authorities of that town have done. Northampton has a Board of Commissioners for dealing with sewage and kindred nuisances, which is distinct from the corporation. I believe their number is limited to twelve, of whom six belong to one political body and six to the other. These twelve commissioners, as a body, must therefore, be non-political, six of one being equal to half-a-dozen of another. The town contains at present about 50,000 people. Many experiments were made at the expense of this body for purifying the sewage. At last they adopted the scheme which I proceed to describe. Near the town there is a number of tanks in which the sewage is allowed to settle for some time, so as to allow the more bulky of its solid contents to fall to the bottom and be collected. Deprived of these solid matters (This is the intercepting system) the sewage is conveyed in a main culvert about four miles from the town, where it is received on a tract of ground containing upward of 300 acres, which was purchased at a cost of £130 an acre. * * Up to the present the outlay has amounted to upwards of £80,000. The soil is not naturally the best adapted for sewage farming; it does not, however, offer any insuperable obstacle to success. The sewage is received at the highest point of the farm, from which it flows by gravitation to the lowest, which is several feet below the main that runs by, and into which the sewage passes after it has undergone clarification. The sewage is distributed over the farm by a simple system of carriers, and it is used mainly for irrigation. After it goes over one plot it flows to another, and so onwards. At the lowest part of the farm a permanent plot of osiers has been planted, the intention being that this plot will serve as a filter-bed for abstracting from the sewage all offending material which is not taken out by irrigation. After percolating through the soil of this osier bed the clarified sewage is received in a second, or outlet culvert, which is about two miles long, and in which the fall—one foot to the mile—is less than

that of the river." Here we have the idea carried out on land that I spoke of in the tumbling about of the water—the oxidizing of the organic compounds of the sewage. The writer goes on to speak of the crops which are grown, and says : " The land is not farmed in what could be called a skilful manner, indeed the engineer frankly said that up to the present, farming had been a secondary object with the commissioners." He then devotes a few sentences to a description of the land and the cost, etc., and concludes his remarks as follows : " It will be understood at once that the inhabitants of Northampton have been rid of the abominable stench which the sewage formerly inflicted on them. But there remains for consideration two points of very great importance to the people who live along the river below the sewage farms. In the first place, if the sewage be not deprived of its organic impurities on the farm, it must, on mixing again with the river, cause a fresh nuisance. That the people do think so is evidenced in a newspaper report which lies before me, and, judging from what I saw of the effluent water, I can sympathize with these people. I took a small bottle of water, which I found contained a large quantity of organic matter. As it went on the osier bed, it was still sewage most unmistakably, and when the pores of this bed—this so-called filter bed—become full of organic impurities, as they soon must, the complaints will become louder and louder, and justly so. I have a second objection to the arrangements here adopted, and it is this : What guarantee is there that the *contagium* of any infectious disease which may be in the sewage is destroyed. That *some* of it would be oxidized or destroyed in flowing over the ground is certain, but the necessities of the case require that the whole of it should be destroyed. I have made experiments which prove conclusively that the contagium of infectious cattle diseases is not destroyed in flowing over land, nor in passing through such a filter as here provided, and as there is no evidence to show that the contagious principle of human infectious diseases is not equally active, it cannot be said that the commissioners of Northampton have satisfactorily disposed of the sewage of that town."

From what has been said, I think it may safely be concluded that the water in the bay is in a very bad condition ; that when the waterclosets of the city shall have been connected with the sewers, the water will be in a much worse state than now ; that intercepting

the solid portions will not render the sewage innocuous ; that the contagium of cattle disease is not destroyed by the intercepting process ; that there is reason for believing that the contagium of human diseases is not ; and lastly, that the bay is likely to become dangerous to the health of the city if something is not done to put a stop to its further contamination. For years I have maintained that the directions of our Heavenly Father to the children of Israel, in the 23d chapter of Deuteronomy, are the only safe ones to follow, modified, of course, to our present different manner of living.

The Provincial Board of Health, of Ontario, has issued a valuable pamphlet on the disposal of sewage, in which the "Dry Earth System" is highly recommended. A number of dry earth closets are described, all of which appear to be good, but the one best to be chosen is not a matter for this paper.

A few years ago, I read in the agricultural department of the *New York Tribune*, an article on the manurial value of excreta. The writer stated that the excreta from each person was worth ten dollars a year. It appears to be a very high estimate, but if he is correct we shall soon be throwing four hundred thousand dollars worth of manure into the bay each year, after paying another four hundred thousand dollars for the doing of it. There can be no doubt that there is a great waste of valuable manure, but not so large as the *Tribune* writer's estimate.

From all I have been able to learn, it would appear that while there can be no revenue obtained by using earth closets, it does seem to be a fact that the excrementitious matter of the entire city can be disposed of without cost, or in other words, that it can be made to pay for itself. The manner of doing it can be learned from the boards of health of many of the cities in the old land, as well as in the States. If public opinion can only be aroused on this subject as it has on the subject of intemperance, there will be no difficulty in the matter. Let our city fathers frame a by-law compelling every householder to use earth closets only ; let there be honest and competent inspectors appointed to look after every house, and let there be severe punishment meted out to all infractors of the ordinance. If it be not competent for the City Council to act without further legislation, there surely would be no great difficulty in getting an Act of Parliament bearing directly on the

subject, or giving power to the civic fathers to frame suitable by-laws to meet the case.

Since writing the foregoing, the bay has been covered with nearly two feet of ice, and it occurred to me that it would be well to test the water while oxygen was nearly entirely excluded from it, as well as to test the water from melted ice taken from the bay. To do this I got a bottle of water from a point away to the east of the Cathcart street sewer, and another from the place where they get the ice used in the city. I got ice from both places as well. As there could be very little oxidation the water proved to be as bad, if not worse than No. 5 of our former testings. There was very little, if any, difference between the two specimens.

There is, I think, a general feeling that water, in freezing, (particularly if there be a considerable depth of water), does not take up impurities to any great extent. Housewives tell us that water from melted ice is always *soft*, even if taken from bodies of water known to be hard. Now, if the carbonate and sulphate of calcium of hard water are found absent in the ice frozen on such water, why may we not conclude that other compounds held in solutions would also be absent? Arguing from that conclusion, I tested the ice from the two points named and found it comparatively pure—much purer than the water from the hydrants, so that I think we need have no hesitation about using the ice from the bay.

RACE IDENTITY OF THE OLD AND NEW WORLDS.

BY WILLIAM GLYNDON.

The subject I will endeavor to discuss before you to-night is one on which there has been much theorizing, much conjecture; one that may or may not have hitherto engaged your attention, viz: The race identity of the first colonizers of the so-called New World; more particularly of those parts known as Mexico, Central America, and Peru. That all these countries have been the seat of an antique and advanced civilization, is now an universal concession. In what that civilization consisted, or whence its birth, is yet a problem to

solve, though one on which science and research have already thrown much light.

Scattered over vast tracts of country, now little better than desert wastes, are ruins and remains of great cities and monuments that have been the astonishment of the modern world. They arise and confront us on every hand throughout the countries named—among groves of wild cactus, on the slopes of mountain sides, by the shores of lake and ocean—mute, unspeakably attesting amid a Pandora land of desolation, the grandeur of that lands forgotten past. “Generations after generations have there stood, have lived, have warred, grown old and passed away; and not only their names, but their nation, their language has perished, and utter oblivion has closed over their once populous abodes.”

At first there might seem a hope of finding a solution to the problem of their identity in the history or records of the races who inhabited Mexico, Central America and Peru, at the date of the Spanish invasion. Turning to these races we find only two divisions who claimed to have been in the country for a great time; these were the Mayas, of Yucatan, and the Queches, of Guatemala. The former had a tradition claiming that their remote forefathers came from “the land in the East,” *across the sea*, by a passage-way which was opened for them. Their leader was the culture hero “Zamna,” the author of their civilization, the teacher of letters, and the god of all beneficence to their race.

The Queches placed their original migration as from a point in the East also, where *white* and *black* men lived peaceably together, and all spoke the same language. Here they awaited the rising sun, and prayed to the Heart of Heaven.

This race had a written record called the “Popul Vuh” (Sacred Book), which contained a legend of the destruction of the world by a great deluge, as follows: “Then the waters were agitated by the will of the Heart of Heaven (Hurakan), and a great inundation came upon the heads of all creatures. They were engulfed, and a resinous thickness descended from heaven; the face of the earth was obscured, and a heavy darkening rain commenced—rain by day, and rain by night. There was heard a great noise above their heads, as if produced by fire. Then were men seen running, pushing each other, filled with despair; they wished to

climb upon their houses, and the houses, tumbling down, fell to the ground ; they wished to climb upon the trees, and the trees shook them off ; they wished to enter into the grottoes, and the grottoes closed themselves before them. Water and fire contributed to the universal ruin at the time of this great cataclysm." From these two sources we have but little light on our subject. We are told these races migrated from a point in the far East ; and the startling announcement is made that they came across the sea—the Mayas by means of a passage-way opened for them, and the Queches in barks or ships. We are also told the world, in the first age, was destroyed by a great cataclysm, thus indicating a transmitted knowledge of the deluge. But further than this, we know not. Where that land in the East was, or at what date they first landed in America, and what was accomplished in their new home during the long intervening centuries, they could not tell ; their history appeared to have been lost in the far night of ages. Whether these tribes who inhabited Central America at the date of the New World's discovery, were the lineal descendants of the first colonizers, is a point of discussion ; if so, they must have woefully degenerated from their original advancement, as they lived in squalid huts, had scarcely any form of civil government, and were ignorant of the majestic ruins by which they were surrounded.

That the powerful nation of Aztecs and kindred tribes whom Cortez conquered in Mexico, and the Incas, whom Pizzaro conquered in Peru, were a people of comparatively modern date, we know from their own records ; the Aztecs placing the date of their entrance into Mexico at about 1300 A. D., and the Incas their advent into Peru at about 1021 A. D. The Incas wrested their power from the Capan and Aymaran races, whom they described as being in many cases, a people of *auburn hair* and *blue eyes*. On a mountain by the sea are the ruins of a grand and stupendous temple of Pachacamac (Creator of the Earth), the supreme God of the Peruvians. This temple is supposed to have been built by the Aymaran race. Through this race also, the worship of one Divine God is supposed to have been transmitted to the Peruvians. From the Capan races the Incas derived their worship of the Sun and Moon ;—to their own semi-barbarianism they owed the more repulsive rites of their worship.

The Aztecs say they found in Mexico a people of ancient race and high civilization called the Toltecs, who were *fair, robust and bearded*. This race they conquered, and like the barbarians who overran Rome, they borrowed the arts and customs, and clothed themselves in the civilization of the nation whom they had defeated.

Leaving the Toltecs here for the present, we will turn to certain propositions already advanced and generally conceded by Archæologists, men of science, and researchers generally, viz : That the early American races were a people advanced in architecture to an heroic perfection, as evinced in the ruins left us of temples, walls, palaces and pyramids—hundreds of the latter yet complete.

That they possessed the finer arts of painting, engraving and sculpture, as shown by their frescoes and carvings, ornate and emblematical, on the walls of their palaces and temples.

That they were workers in metallurgy, using copper, tin, iron, gold and silver ; they also made beautiful wares in pottery and glass, many perfect specimens of which can be seen in the different museums.

That they must have had a systematized government, probably despotic—as we shall later show—is indicated in their great public works, particularly in Peru and Yucatan ; some of which can scarcely be paralleled even in Europe. From among the number we may enumerate : roads two thousand miles long—that in the words of Humboldt. “They were the most useful and stupendous ever erected by man. Massive stone, and even suspension bridges spanning streams and chasms ; aqueducts and reservoirs for irrigation, some of which were three hundred miles long.”

That all the countries named must have been densely populated is self-evident from the vast number of ruined cities that strew the land from the confines of Mexico to those of Peru.

Norman, an explorer who visited the ruins of Central America early in this century, concludes their builders must have had a profound knowledge of geometry, as he had measured all details by plumb and line, and found them to conform to each other with perfect accuracy in all parts.

Just here it may not be impertinent to our subject to refer in detail to some of the greatest of the ruined cities and pyramids. The same writer we have just quoted says, in referring to the ruins

of Chichen Itza, in Yucatan : "For five days did I wander up and down among those crumbling ruins of a city, which I hazard little in saying must have been one of the largest the world has ever seen ; I beheld before me for a circuit of many miles in diameter the walls of palaces, temples and pyramids, more or less dilapidated. The earth was strewn as far as the eye could distinguish with columns, some broken and some perfect, which seemed to have been planted there by the genius of desolation which presided over this awful solitude."

The ruins of another city, in Peru, are said to cover an area of *not less than twenty square miles*, in which can be traced the foundations and fragments of temples, palaces and tombs on every hand.

Greater than either of these cities are the ruins of Otolum, in Guatemala. They were first surveyed in 1787 by Capt. Del Rio, sent out by the Society of Geography in Paris. To quote his own words, as taken from a published report, the ruins are "of a stone city of no less dimensions than seventy-five miles circuit—length thirty-two, and breadth twelve miles—full of palaces, statues, monuments and inscriptions."

This city had for its centre a great temple, built on a natural formation like the Acropolis at Athens, with majestic fragments lining off on all sides.

To give an idea of the size of the stones used in erecting some of these great cities of antiquity, we quote the words of Humboldt regarding the ruins of Cuzco, in Peru : "Aersto," he says, "measured some stones at Traquanaco which were twelve meters (38 feet) long, five meters, eight-tenths (18 feet) broad, and one meter, nine-tenths (6 feet) thick.

The stones used in building the temple of Solomon were but a trifle larger than these, some of which were twenty-five cubits (43 feet, 9 inches) long, twelve cubits (29 feet) wide, and eight cubits (14 feet) thick, reckoning twenty-one inches to the cubit."

Says the historian Priest : "There is in Central America, on the west declivity of Anahuac, to the southeast of the city of Cuernivaca, an isolated hill, which, together with the pyramid raised on its top by the ancients of that country, amounts to thirty-five rods, ten feet altitude. The ancient tower of Babel, around which the city of Babylon was afterwards built, was a mere nothing

compared with this gigantic work of Anahuac, being but twenty-five hundred feet square, which is one hundred and fifty rods, or nearly so, while the pyramid we are speaking of, partly natural, partly artificial, is at its base twelve thousand and sixty-six feet;—this, thrown into rods, gives seven hundred and fifty-four, and into miles is two and three-eighths, or nearly so, which is five times greater than that of Babel.”

The same author says, in referring to the magnitude of the tumuli and pyramids found along the Mediterranean: “But whatever power, wealth and genius these may exhibit—where the Egyptians, the Phœnicians, the Persians and the Greeks have displayed the monuments of this most ancient sort of antiquity—all, all is realized in North and South America, and doubtless under the same superstitions and eras of time.”

Herodotus tells us that a hundred thousand men, relieved every three months, were employed in building the pyramids of Cheops in Egypt. Ten years were spent in preparing the road whereon the stones and material were to be transported, and twenty more in erecting the edifice. Yet all this expenditure of time, of human life and labor, was primarily for the glorification of a single prince in his attempt to prove to posterity that the gods alone were not immortal, and secondly, as an imperishable burial place after death. Just here occurs the thought that if such were the object and use of pyramids in the Old World, why is it not equally probable that such was the purpose of their erection in the New? If so, the people by whom they were erected must have been a people of bondsmen or slaves, who were ground under the heel of a cruel despotism. Indeed there are many reasons to believe—from their great pyramids, and the peculiar formation of their cities—that the early Americans lived under an ultra-despotic government, probably an oligarchy, as such monuments could only have been raised to glorify the few at the blood and expense of the many.

Now comes the question as to the age of these ruins and monuments. How are we to locate the date of their origin if we have no key to their identity, save their time-effaced frescoes or moss-grown columns and walls, many of the latter 15 feet or more in thickness, and built with an art and strength that defy alike competition and decay? Norman answers the question by comparing them to the ruins of other cities of which we have some knowledge. “The

result of such a comparison," he says, "startles the mind with their probable antiquity." Taking for comparison the "Cloaca Maxima," of Rome, constructed nearly twenty-five hundred years ago to drain the waters of the Forum into the Tiber, he finds it without a stone displaced, performing to the present day its destined service. "What then," he asks, "must be the age of these ruins of Chichen Itza? Evidently Chichen Itza was an antiquity when the foundation of the Parthenon at Athens, or the Cloaca Maxima at Rome were being laid." "Only in the ruins of Baalbeck, Antioch, of Carthage," or, he adds, "may we not say of Thebes, of Tadmor, of Memphis, do we find an equal ruin and desolation."

Thus we have demonstrated to us that these remains are of vast antiquity; they have come to us through the long void of ages as living testimonials to a buried past, and we cannot but accept the conclusion that their builders—a people capable of such majestic creations, adorned with painting and sculpture, and who were workers in glass and metallurgy—must have been a people of long and refined civilization, dating from hundreds, or maybe thousands of years B. C.; otherwise such creations could never have been conceived or executed. Further, that these remains were the work of a kindred race, is evident in their general resemblance, their apparent purpose, age, and general style of architecture. And the origin of all these bygone nations, tradition unites in saying, was in the land of the far off East, beyond the sea.

In tracing out the identity of any nation, there are two channels outside of language or public record, by which it may be possible to trace back to the fountain-head the origin of that nation. These two channels are Architecture and Customs: the former including all details of sculpture and ornamentation, particularly as applied to temples of worship, places of sacred or public resort, and also public monuments and works; the latter, the rites of worship, modes of living, modes of justice, public ceremonies, public laws, and all the other vital principles that form the sub-strata of a nation's strength and greatness.

When a colony of people branches off from the parent stock, and become citizens of another country, they will carry with them the peculiar customs, as well as language of the fatherland. In the course of time, as these people increase and multiply, the

population will be divided into cities, towns, villages and rural districts, as in our own Province of Ontario to-day.

With this division will begin their architectural era, and here, too, the parent land will find transcript. The buildings, monuments, public halls and temples erected by them, will be in copy of those erected by their forefathers. They may have architects who will enlarge or modify preconceived ideas or designs, but in the case of emblematical monuments, or temples consecrated to religious purposes, the original conception will be faithfully followed. More particularly would this be the case among races of an earlier day, when the schools of architecture were unknown, and the era was one of darkness and superstition.

Hence, appropriate to our subject, if we could gain a knowledge of the customs of the early American races, together with a detailed examination and comparison of the American ruins, we might through these channels locate in what nation the early civilization of the New World took its birth. For this purpose we will again turn to the Toltecs, as these were probably the most authentic descendants of the early colonizers of whom we have any record. As we have said before, they are described as having been a *fair, robust, bearded* race, who preceded the Aztecs in Mexico centuries prior to the advent of the Spaniards. Prescott says that "through pestilence, famine, and unsuccessful wars, they disappeared from the land as silently and mysteriously as they had entered it, the greater number spreading over Central America and the neighboring isles. They were the true civilizers of the Aztecs themselves, the latter borrowing their most useful arts, as well as their complex arrangement of time."

This nation, according to their Mexican chronicler, located their origin "*across the sea, in the distant East, the fabulous Hue Hue Tlapalan. Their leader was Quetzalcoatl, a white man, with a strong formation of body, broad forehead, large eyes, and flowing beard. He wore a mitre on his head, and was dressed in a long white robe reaching to his feet and covered with crosses. In his hand he held a sickle. His habits were ascetic, he never married, and was most chaste and pure in life. He condemned sacrifice, except fruits and flowers, and was known as the god of peace; for, when addressed on the subject of war he shut his ears with his fingers.*" Of the first home of the great Toltec race—the mysterious

Hue Hue Tlapalan—the same historian just quoted, says : “ It is found in the history of the Toltecs that the age of the first world, as they call it, lasted 1716 years ; that men were destroyed by tremendous rains and lightning from the sky ; and even all the land, without exception of anything, the highest mountains, were covered up and submerged (coxtolmocatl) *fifteen cubits* ; and here they added other fables of how men came to multiply from the few who escaped from destruction in a large chest (toptlipetocali), and how, after men had multiplied, they erected a very high tower (zacali), in order to take refuge should the second world be destroyed. Presently their language was confused, and being unable to understand each other, they went to different parts of the earth.”

It must be remembered these records were written by an Aztec prince and historian who lived about the time of Cortez, and who received his information from the archives of his family. By comparing this version of the flood legend with the account given in the Book of Genesis, a striking analogy will be found ; it will also be observed that these people had a clearly preserved account of the building of the tower of Babel.

Further than this the Mexican historian throws no light on the early history of the Toltecs ; he leaves us in darkness as to the exact location of that Tlapalan land in the far East, though we cannot doubt it was among those teeming nations of the Orient, that have been the first great womb of all mankind.

When the Aztecs first entered Mexico they were little better than our Northern savages, but they were a strong, brave, and war-like people, and by the latter part of the 14th century had all the country under their subjection. It was at this time they began the adoption of the manners and customs of the Toltecs, absorbing one by one the different branches, until the civilization of the conquered lived again, to a certain degree, in that of the conquerors. It is in this manner then, that we have transmitted to us, though perhaps in a perverted form, the customs of the Toltecs ; these in turn received their knowledge through the far branches of the Nahua family, who are unquestionably supposed to have been a part of the first colonizers. Therefore, by a close consideration of the customs existing and practiced among the Mexicans at the time of the Cortez

invasion, we may, by comparing the same with those of other nations, glean some light at the identity of those earliest races.

We will take first in order, as the most vital of customs, the rites of religion. "The Aztecs," we are told by Prescott, "inherited from their Toltec predecessors the belief in a supreme Creator and Lord of the universe. They addressed him in their prayers as "the God by whom we live," "omnipresent, that knoweth all thoughts, and giveth all gifts," "without whom man is nothing," "invisible, incorporeal, one God, of *perfect perfection* and purity," "under whose wings we find repose and a sure defense." "These sublime attributes," continues Prescott, "infer no inadequate conception of the true God. But the idea of unity—of a being with whom volition is action, who has no need of inferior ministers to execute his purpose—was too simple or too vast for their understandings, and they sought relief as usual in the plurality of deities; who presided over the elements, the changes of the seasons, and the various occupations of man." At first the ceremonies of the Aztecs were of a light and cheerful order, consisting of national songs and dances, in which both sexes joined. Processions of women and children crowned with garlands, and bearing offerings of fruits, the ripened maize, or sweet incense of copal and other odoriferous gums, while the altars of the deity were stained with no blood save that of animals. Human sacrifices among the Aztecs were not adopted until early in the 14th century, about two hundred years before the invasion of the Spaniards. Turning to the history of the Egyptians, we find that their earliest worship was of but one God, infallible and eternal, without beginning, without end. They believed a heaven awaited the good, and a hell the wicked; there was a judgement day when the hearts of all men were weighed. At first their sacrifices were of fruits and flowers, and sweet incense smoked on their altars; later on they personified God in the sun, whom they addressed as "Ra;" still later the purity and virtue of their primitive faith became buried under the conception of polytheism.

The Aztecs embalmed their dead by taking out the bowels and replacing them with aromatic herbs and substances, after which they, in many instances, wrapped the body in a covering of cloths. Turning to Rollin's History of Egypt, we are told that the Egyptians embalmed *their* dead by cutting a hole in the side with an Ethiopian stone that was as sharp as a razor; the body was then taken and

filled with cinnamon, myrrh, and all sorts of spices ; after a certain time it was swathed in lawn fillets, which were glued together by gum, and crusted over with most exquisite perfumes.

The rite of circumcision was one practiced among the Phœnicians, Hebrews, and Egyptians. It was instituted among the Hebrews in the time of Abraham as a sign and seal of the covenant which God had made with him. It was known among all the nations mentioned as an expressive and emblematical symbol of purity, as a means of purging moral turpitude, and propagating righteousness.

What is our surprise, then, to find this same rite established among the Toltecs and early races of Central America, endowed with the same moral properties as it possessed among the nations enumerated. Such a ceremony as this inducted among the early American races at a period, (we know not when), could only have been known to them as an hereditary rite, or as a graft from some other nation. Outside of Egypt or Phœnicia to what other nation can we trace it ?

Schoolcraft says a peculiar belief among the early American tribes was, that the souls of men, upon death, continued to live in the bodies of animals or other men, the existences thus continued being graded according to the manner in which the lives of their possessors had been conducted ; if life was just, the continued existence was of a high order ; if unjust, or wicked, the souls descended into the bodies of toads and reptiles. Rollin says : " It is to Egypt that Pythagoras owed his favorite doctrine of Metempsychosis, or the transmigration of souls. The Egyptians believed that on the death of men their souls transmigrated into other human bodies, and that if they had been vicious, they were imprisoned in the bodies of unclean or ill-conditioned beasts, to expiate in them their past transgressions ; and that, after a revolution of some centuries, they again animated other bodies."

The Egyptians prognosticated the future from the condition of the internal organs of animals offered in sacrifice. A like custom was performed by the priests among the Peruvians.

No one but the high priest of the Egyptians was supposed to enter the sacred recess of the inner temple, the " Holy of Holies." This same observance was rigidly enforced among the Peruvians

The rainbow from time immemorial was a token among the early Peruvians and people of Central America, that the earth would not again be destroyed by a deluge.

Not only infant baptism by water was found both in the old Babylonian religion and among the Mexicans, but the offering of cakes,—which is recorded by the prophet Jeremiah as part of the worship of the Babylonian goddess-mother, “The Queen of Heaven,”—was found in the ritual of the Aztecs.

The Mexicans hung up the heads of their sacrificed enemies ; this was also a custom practiced among the Jews : “ And the Lord said unto Moses, ‘ Take all the heads of the people, and hang them up before the Lord, against the sun, that the fierce anger of the Lord may be turned away from Israel. Slay ye every one, his men that were joined at Baal-peor.’ ” (Numbers, xxx : 4, 5.

As among the Jews, the ark was a sort of portable temple in which the Deity was supposed to be continually present, so among the Mexicans and tribes of Honduras, an ark was held as an object too sacred to be touched by any person but the priest—(Kingsborough’s Mexican Antiquities, page 258).

The practice of deforming the skull and forehead by means of bandages or bands was prevalent among the Egyptians and other nations of antiquity ; so, too, was the custom practiced among the early American races. A number of carved heads surmounted by casques, and having a peculiar form of elongation, found in Stucco-relief in the ruins of Palenque, are duplicated in the same form of skull found on an Egyptian monument of the tomb of Rameses II.

The Aztecs, or Toltecs, like the Egyptians, had progressed through all the three different modes of writing,—the picture writing, the symbolical, and the phonetic. They recorded all their laws, their mythology, astronomical calendars, and rituals, their political annals, and their chronology. They wrote poetry and cultivated oratory, and paid much attention to rhetoric. One of the most important accessions gained by the Aztecs from the Toltecs was their mode of dividing time. They embodied a part of the knowledge thus gained by engraving an immense circular block of stone with ciphers and hieroglyphics, by means of which they were enabled to settle the hours of the day with precision, the period of the solstices and the equinoxes, and that of the transit of the sun

across the zenith of Mexico. Prescott says : "Their year consisted of $365\frac{1}{4}$ days, composed of 18 months of 20 days each, the months being divided into four weeks of five days each, on the last of which was held the public fair or market day. Five complimentary days were added, as in Egypt, to make up the full number of 365. As the year was composed of nearly six hours more than 365 days, there still remained an excess, which was provided for by intercalation. They waited until the expiration of 52 years—cycles which they termed "sheafs"—when they interposed 13 days, or rather $12\frac{1}{2}$, this being the number which had fallen in arrear. Had they inserted 13, it would have been too much, since the annual excess over 365 is about 11 minutes less than 6 hours. This intercalation of $12\frac{1}{2}$ days every 52, or 26 days in every 104 years, shows a nicer adjustment of civil to solar time, than is presented by any European calander, since more than five centuries must elapse before the loss of an entire day."

This perfect system of time could never have been the work of other people than those of the most refined and antique civilization, which transmitted from age to age its improvements in astronomical knowledge.

For such a civilization we must again turn to the cradle of the East, and to Egypt, that grave and serious nation whom the Greeks considered the "womb of wisdom."

There we find (Rollin's Ancient History, page 20,) that during the reign of Osymandyas, the third king of Egypt—about 2100 B. C.—the Egyptians divided the year into 12 months, each consisting of 30 days, to which they added every year 5 days and 6 hours. The extra five days added by the Mexicans belonged to no month, and were regarded as days exempt from labor or business, to be given over to indulgence as suited the tastes of the people. Plutarch states that in Egypt, during the same epoch, people dressed in holiday attire, and celebrated the birth of the gods by festivals and public gatherings.

Is this mode of computing time between two such remote and antique nations, not a most striking parallelism, as well as the similitude in mode of observing the extra days at the end of each year? Can we accept such a coincidence as other than a proof that the American races borrowed their system of time from the

Egyptians, or that each system was the same, and that they had a *common origin*? In further proof we may cite that the Aztec and Egyptian year each began on the 26th of February. Humboldt says: "That the majority of the names of the twenty days employed by the Aztecs are those of a zodiac used since the most remote antiquity among the people of Eastern Asia."

We will now turn to the testimony of the American ruins and pyramids, and will first consider the pyramids as bearing greatest evidence by their peculiar formation and general analogies, to the theory of early American colonization from Egypt. In America it was found by minute survey that nearly all pyramids were erected with their sides to the cardinal points. Turning to the Egyptian monuments, we find them built with the same careful observance as to position. The Egyptian pyramids were penetrated by small passage-ways; so also were those in America. Says Ignatius Donelley: "In one of the largest pyramids of Mexico, at a point 69 feet from the base, is a gallery large enough to admit a man crawling on hands and knees, which extends inwards on an incline a distance of 25 feet, and terminates in two square wells or chambers, each 5 feet square, and one 15 feet deep." Mr. Bancroft (*Native Races*, Vol. IV, page 433,) states that the same gallery "is 157 feet long, increasing in height to over $6\frac{1}{2}$ feet as it penetrates the pyramid; the well is over 6 feet square, and extends apparently from the base to the summit. In the great pyramids of Cheops, in Egypt, there is a similar opening or passage-way 49 feet from the base; it is 3 feet 11 inches in height, and 3 feet $5\frac{1}{2}$ inches wide; it leads down a slope to a sepulchral chamber or well, and connects with other passage-ways leading up into the body of the pyramid."

In both Egyptian and American pyramids the outside of the structure was covered with a thick coating of smooth, shining cement.

Humbolt considered the pyramid of Chohulma in Mexico of the same type as the temple of Jupiter Belno, the pyramid of Medioun Dachhour, and the group of Sakkarah in Egypt.

The most ancient form of the Egyptian pyramids known—that with flat tops. This style is the prevailing form among those in America.

Senor Garcia Cubas, an eminent Spanish writer, thinks the group of pyramids at Teotihuacan (Mexico) was built for the same

purpose as those of Egypt. He considers the analogy established in eleven particulars, as follows: (1) the site chosen in the same; (2) the structures are ornamented with slight variations; (3) the line through the centre of the structure is in the astronomical meridian; (4) the construction in grades and steps is the same; (5) in both cases the larger pyramids are dedicated to the sun; (6) the Nile has "a valley of the dead"; (7) some monuments in each case have the nature of fortifications; (8) the smaller mounds are of the same nature and for the same purpose; (9) both pyramids have a small mound joined to one of their faces; (10) the openings discovered in the pyramid of the Moon, are also found in the Egyptian pyramids; (11) the interior arrangements of the pyramids are analogous.

Donelley states that he finds in America almost a counterpart of the Egyptian obelisk. "Between the hills of Mendoza and La Puentor (Peru) is a pillar of stone, 150 feet high, and 12 feet in diameter, engraved with hieroglyphics." At Copan, also in Peru, are a number of detached columns, standing apart and solitary, as do the obelisks of Egypt; they are square or four-sided, and covered with sculpture.

Priest says, in referring to the ruins of Otolum in Guatemala: "It is found that all the goods of the ancient Egyptians, even Osiris, Apis and Isis, are sculptured on the stones of this city, the worship of which passed from Egypt to many nations, and is found under many forms, but all traceable to the same original."

Dr. Arthur Schott, in describing a gigantic face on a monument of Uxmal, Yucatan, says: "Behind, and on both sides from under the mitre, a short veil falls upon the shoulders, so as to protect the back of the head and neck. This particular appendage vividly calls to mind the same feature in symbolic adornment of Egyptian priests, and even those of the Hebrew Hierarchy."

Norman makes this statement regarding the same ruins: "The western facade is ornamented with human figures, similar to *caryatides*, finely sculptured in stucco with great art. Their heads are covered with a casque, and ear ornaments similar to those worn by the Egyptians."

The vocal statues of Egypt and Greece were duplicated in America. In Peru, in the valley of Rimac, there was a large stone idol which answered questions, and became famous as an oracle.

Among both the Egyptians and Peruvians the walls receded inwards, and the doors were narrower at the top than at the base.

Thus we might go on through other pages, pointing out other analogies equally striking, but time will not allow; besides have we not already enumerated sufficient similitudes to indicate that the American and Egyptian races of antiquity had a co-existence, and that the one must have been in some way, direct, or indirect, an offshoot from the parent stock of the older nation? When we find two such widely separated peoples employing the same form of architecture, having a like religion, a similarity of customs, arts, sciences, manners and traditions, and each at a date of remote antiquity, it does seem wholly compatible that we should assign to each a common origin.

The question may be asked, "How could the Egyptians ever have reached America by water?" In answer we quote the historian Rollin, who states: "The Phœnician sailors in the employ of Pharoah Necho, 516 B. C., made a voyage completely around Africa, returning by the straits of Gibraltar." This, it must be remembered, was at a date long before the mariner's compass was supposed to have been known.

From another writer, Gooderich, we learn that "In the tomb of Rameses the Great—1577 B. C.—is a representation of a naval combat between the Egyptians and some other people, supposed to have been Phœnicians, whose large ships were propelled by sails." Now if 1577 B. C., 500 years after the deluge, large ships propelled by sails were in existence, is there anything improbable in the supposition of a voyage having been made across the Atlantic, when a greater one was made, later on, in the circumnavigation of Africa? It is true we have no known allusion to America in Egyptian history, but it is a grounded fact that Egypt was a country of high civilization when her history began. Renan says: "It has no archaic epoch." Osborne says: "It bursts upon us in the flower of its highest perfection." Rawlinson says: "Now in Egypt it is notorious that there is no indication of an early period of savagery or barbarism. All authorities agree that, however far back we go, we find in Egypt no rude or uncivilized time out of which civilization is developed. Menes, the first king, changes the course of the Nile, makes a great reservoir, and builds the temple of Pthah at

Memphis. * * We see no barbarous customs to indicate primeval state.

Therefore in a land like this, which was full of perfection and wisdom, when all Europe was but a land of unknown barbarism, was it not possible for her to have planted colonies across the sea, in a country fair and beautiful, with all the advantages of climate and soil, and yet have left no traces of them in her history? Such traces may have existed, together with the records of her own earliest age, for aught we know. We find her at the first dawn of history, the greatest of the great; we find her to-day the basest of the base, a living example of the truth of God's prophecy, "It shall be a base kingdom, the basest of kingdoms." (Ez. xxix chapter, 14 and 15 verses). As ran her race, so may have run that of her people in this New World. The history of Memphis, of Tadmor, of Thebes, may have been repeated alike in grandeur, alike in decay by the great cities of the American continent. Divine wrath may not have been satisfied within the bounds of the parent kingdom, but have extended itself, an unsparing Nemesis to the root and branch of all the race, and levelled them to the dust in the ruin, savagery, and desolation of to-day.

Here we will leave our subject. We have endeavored to show by points of analogy, the identity of the early American races in the people of Egypt; if we have not been fulsome in detail, we trust the want of completeness will be overlooked when the brief summary contained in this paper is considered in comparison with the magnitude of the subject.

REPORT OF
GEOLOGICAL SECTION
—OF THE—
Hamilton Association.

READ AT ANNUAL MEETING, MAY, 1885.

OFFICERS—1884-1885:

GEORGE DICKSON, - - - *Chairman.*

ANDREW T. NEILL, - - - *Secretary.*

WILLIAM KENNEDY, { - *Executive Committee.*
WILLIAM TURNBULL, }

During last year, the members devoted most of their time in connection with the work of the section in rearranging the fossils in the cases, and adding, where required, the missing species or families to complete, as far as possible, the fauna, as known in the different rock systems represented in our collection. Also the classifying, labelling and arranging of the large number of fossils added during the year from different sources, and particularly from Col. C. C. Grant, who visited the Island of Anticosti during the summer and there obtained a great number of specimens for our collection from the Hudson River, Anticosti group, and Post Pliocene formations. The Post Pliocene formation was not known to exist on the island until discovered by Col. Grant, who collected several varieties of the *Mya*. The section secured donations from the following: Mr. Drake, on behalf of the estate of the late Mr. W. Murray; C. N. Bell, F. R. G. S., Winnipeg; and from the late Rev. Dr. Kemp (see appended list.)

List of Specimens presented by Col. C. C. Grant to the Museum of the Hamilton Association, 1885.

No.	Name.	Group.	Locality.	District.
1	<i>Palaeophyllum divasicaus...</i>	Hudson River	Miamisburg	Ohio
1	<i>Stellopora Anthracoides...</i>	" "	Lockland	"
1	<i>Chaetetes rugosa</i>	" "	Cincinnati	"
2	" <i>Clathratubus</i>	" "	"	"
1	" <i>Jamesi</i>	" "	"	"
1	" <i>gracilis</i>	" "	"	"
2	" <i>Dalei</i>	" "	Lockland	"
1	" <i>Fletcheri</i>	" "	Williamsburg	"
1	" <i>quadratus</i>	" "	Miamisburg	"
1	" <i>delicatus</i>	" "	"	"
1	<i>Orthis testudinaria</i>	" "	"	"
1	" <i>acutirata</i>	" "	Cincinnati	"
1	" <i>biforata</i>	" "	Miamisburg	"
1	" <i>Macerata</i> (Hall)....	" "	Cincinnati	"
2	" <i>Sulquadiata</i>	" "	Miamisburg	"
3	" <i>Ella</i>	" "	"	"
2	<i>Rhynchonella dentata</i>	" "	"	"
1	" <i>increbicans</i> ..	" "	Cincinnati	"
1	" <i>copox</i>	" "	Miamisburg	"
1	<i>Ambonychia Costata</i> (variety)	" "	Cincinnati	"
1	<i>Clyclonema bilex</i>	" "	"	"
1	<i>Crania Scalosa</i>	" "	"	"
1	<i>Bellerophon bilobatus</i>	" "	"	"
1	<i>Calymenia senaria</i>	" "	"	"
2	<i>Arphistoma lenticularia</i>	" "	"	"
1	<i>Murchonia belicincta</i>	" "	"	"
1	<i>Modiopsis concentrica</i>	" "	Franklin	"
1	<i>Strophomena plano convexa</i>	" "	Cincinnati	"
1	<i>Streptorynchus planaris</i>	" "	Miamisburg	"
1	<i>Allarisma regularis</i>	Upper Carboniferous		Missouri
3	<i>Athyris Subtilita</i>	" "		"
1	<i>Chaetetes Milipora</i>	" "		"
1	<i>Productus Coolatus</i>	" "		"
1	" <i>Prattena</i>	" "		"
1	" <i>Nebrascensis</i>	" "		"

No.	Name.	Group	Locality.	District.
5	Chonetes mesaloba.....	Upper Carboniferous		Missouri
1	Fusilina cylindrica.....	" "		"
1	Nuclua ventricosa.....	" "		"
2	Bellerophon Carbinarius...	" "		"
1	Pinna perannnter.....	" "		"
1	Spirifera striatupannis	Lower Carboniferous		"
1	Archimedis reversa.....	" "		"
1	Diplomystes humilis.....	Eocene		Wyoming Territory.
3	Beatreacea (varieties).....	Hudson River		Anticosti
2	Slabs, with numerous specimens of Diplograptus pristis.....	" "		"
1	Graptolites Clintonensis....	" "		"
1	Bellerophon bilobatus.....	" "		"
3	Camerella Ops.....	" "		"
2	Athyris umbonata.....	" "		"
1	" pristina.....	" "		"
3	" headi (Anticostiensis variety).....	" "		"
1	Murchisonia (not determined)	" "	Ellis Bay	"
2	Strophomena Ventral valve.	" "	"	"
1	Cyrtodonta.....	" "		"
1	Orthisura	" "		"
1	Orthoceras Lamarki.....	" "		"
2	" Occidentalis....	" "		"
2	Phragmoceros.....	" "		"
1	Petrai Corniculum.....	" "		"
1	Trilobite (not determined)..	" "		"
1	Asophus platocephalus (Caudal shield).....	" "		"
2	Trilobite fragments (not determined)	" "		"
1	Metoptoma Alcest (Billings)	" "		"
1	Pleurotomaria umbilicatulula.	" "		"
3	Algae (not determined)....	" "		"
2	Orthis, allied to occidentalis	" "		"
1	Orthoceras, showing interior process	" "		"

No.	Name.	Group.	Locality.	District.
1	Cyrtolites compressus	Hudson River		Anticosti
1	Orthis Lynx	" "		"
1	Graplolite (not determined).	" "		"
1	Heliolites instincta	" "		"
2	Rhynchonella copex	" "		"
1	Orthoceras section	" "		"
1	Stromatopora	" "		"
1	Halysites Catenulites	" "		"
1	Pentamerus lens	Anticosti group		"
1	Atrypa reticularis	" "		"
1	Pentamerus Barrandi	" "		"
1	Slab containing a number of Strophomena pecten	" "		"
1	Slab containing numerous specimens of Petraia pyg- maea (Billings)	" "		"
1	Slab showing the burrows of the Saxicava rugosa, also containing modern small Coralaines	" "		"
4	Mya ranaria	Post Pliocene		"
5	" truncata	" "		"
1	Saxicava rugosa	" "		"
1	Ptelina Greenlandica	" "		"

MODERN SPECIMENS.

5	Coralaine, modern	Anticosti
1	Nulipores, "	"
7	Echinus Stringylocentrepes dubuochus	"
1	Chalini Aculata, sponge	"
3	Halechondrie, sponge	"
1	Part of back of a shark	"

Also other specimens not yet named.

List of specimens donated by heirs of the late Rev. Dr. Kemp :

No.	Name.	Group.	Locality.	District. or Province.
1	Linguela acuminata.....	Potsdam	Quebec	Quebec
1	Graptolite.....	Levis	Levis	"
1	Prototarite Logani (Dawson)		Gaspe	"
1	Trinucleus concentrica.....	Trenton	Trenton	Ont.
5	Psilophyton robustus (Dawson)		Gaspe	Quebec
5	" princeps "		"	
1	" rhizoma ornatum (Dawson).....		"	
1	Halysites catenulata.....	Niagara		Ont.
1	Favosites hemispherica.....	Corniferous	Hagersville	"
2	" turbinata.....	"	"	"
1	" Gothlandica.....	"	"	"
1	" basaltica.....	"	"	"
1	" Polymorpha.....	"	"	"
2	Michelinia convexa.....	"	"	"
1	Heliophyllum colligatum...	"	"	"
1	Endophyllum Simcoensis (Billings).....	"	"	"
1	Phillipsastraea gigas.....	"	"	"
1	Diphyphyllum Arundicanum	"	"	"
1	Zaphrentis flustra.....	"	"	"
1	Erieophyllum Eriense.....	"	"	"
1	Brothophyllum decorticum.	"	"	"
1	Zaphrentis gigantea.....	"	"	"
1	Heliophyllum Canadense..	"	"	"
1	Specimen of Coral (not named).....	"	"	"
1	Cystiphyllum Americansus..	Hamilton	Bosanquet	
1	Cyathophyllum Halli.....	"	"	
1	Thorhynchus mulicosta....	"		"
1	Cyrtia Hamiltonensis.....	"		"
1	Obilina.....	Guelph	Guelph	"
1	Ophileta compacta.....	"	"	"
1	Favosites.....	"	Elora	"
1	Spirifera.....	"	Guelph	"
1	Tremerella.....	"	"	"

No.	Name.	Group.	Locality.	District. or Province.
3	Megalomus Canadensis....	Guelph	Guelph	Ont.
1	" "	"	Galt	"
1	" "	"	Elora	"
1	Cystoceras.....	"	Guelph	"
3	Pentamerus.....	"	"	"
6	Murchisonia	"	"	"
2	Pleurotomaria	"	"	"
1	Inoceramus vancouverensis.			B. C.
1	Archimedia Owenansis.....	Keokuk Limestone	Warsaw	Illinois
1	Ammonite Sacya.....	Cretaceous		
1	Subulites eningata.....		Bear Pt.	Anticosti
1	Strophomena (fragment)....			
1	Flint Nodule.....			
1	Molybdenum.....			
1	Champlain Marble (polished)			
1	Lepidodendron	Carboniferous		Pens, U.S.
1	Appatite Crystal (large)....			
2	Trap Rock.....		Calton Hill, Edinburgh,	Scotland
1	Granite (polished).....		Gananoque	Ont.
1	Serpentine.....	Laurentian		Quebec
1	" (polished).....	"		"
2	Hornblende.....			
1	Smoky Quartz Crystal.....			
1	Milky Quartz.....			
1	Magnetic Iron Ore.....		Madoc	Ont.
1	Amygdaloidal trap.....		Pitochry,	Scotland
1	Gneiss.....		"	"
1	Oolite rock.....			
3	Samples of borings in the conglomerate.....			Pens, U.S.

List of specimens donated by Mr. Drake on behalf of the estate of the late Wm. Murray :

12	Specimens of Amethyst Crystals.
1	" Feldspar.
1	" Dogtooth Spar.

- | | | |
|---|-----------|---|
| 1 | Specimens | Lead Ore. |
| 2 | " | Galena Ore. |
| 1 | " | Agate Pebble. |
| 1 | " | Quartz containing Hornblende Crystals. |
| 1 | " | " " Cornelian Pebbles. |
| 1 | " | Boring from Slate Rock. |
| 1 | " | " " Granite. |
| 1 | " | " " Titanite. |
| 2 | " | Scutella Subrotunda, Miocene Formation. |

Also Specimens of Natural History. (See Curator's Report.)

Donated by Samuel Briggs, Esq. :

- 1 Case containing 16 samples of Corundum, in different degrees of fineness, made ready for the manufacture of Emery Wheels.

Donated by ——— :

- 1 Sample of Brown Paint, from Bog Iron Ore.
 1 " Prepared Water Lime, Thorold, Ont.
 1 " Paris Plaster.

Donated by Richard Russell, Esq. :

- 1 Specimen of Native Lead, containing a slight deposit of Silver, from Kansas, U. S.

Donated by David Steele, Esq. :

- 1 Specimen of Quartz (geode), Rocky Mountains.

Report of Curator and Librarian

READ AT ANNUAL MEETING, MAY, 1885.

DONATIONS TO MUSEUM.

Specimens of British Granite. From Messrs. Hurd & Roberts; per Mr. Stiff.

Indian Axe, fragments of Indian Pottery, and specimens of Flints, etc. From Mr. Collins, Burlington; per Mr. Witton.

Poisoned Indian Dagger. From Mr. F. W. Large.

Specimen of Indian Carving in Stone, used by Chief Brant as an inkstand. From Mrs. Green, Burlington.

Indian relics. From Mr. Gaviller.

A Collection. Presented by Mr. John Drake, Bay City, Michigan; being the property of the late William Murray, his brother-in-law, who was for a long time a resident of Hamilton, and a diligent collector in Natural History. Mr. Drake secured the specimens and had them placed in a case at his own expense, to perpetuate the memory of his friend.

DONATIONS TO THE LIBRARY.

Report of Explorations of the Country between Lake Superior and Red River Settlement. Two volumes. Flora Historica. From Richard Brierly, Esq.

Annual Report of the Curator; and Bulletin of the Museum of Comparative Zoology. Ten volumes. From Harvard University.

Hasty Notes on Military Engineering in Europe. Alluvial Basin of Mississippi River. Specimens from Borings in Alluvial Basin of Mississippi River. Fortifications of To-day. Building Stone. Preserving of Timber; and others. Fourteen volumes. From office of Chief Engineer, U. S. Army.

Blue Laws of Connecticut. From C. Lemon, Esq.

A Geological map of the Western part of the Dominion. From F. E. Kilvert, Esq., M. P.

Guide Book, and other documents, giving complete information of the Resources of the Northwest. Report of Minister of Agriculture. Report of Mineral Resources of Dominion. Appendix to Report of the Minister of Agriculture, being the Report of the Australian Exhibition. Report on Canadian Archives. Comparative Vocabulary of Indian Tribes of British Columbia. Descriptive Sketch of the Physical Geography and Geology of the Dominion: by Doctors Selwyn and Dawson. Report of the Select Committee of the House of Commons as to Geological Surveys. From Thos. Robertson, Esq., M. P.

Circulars of Information from the Bureau of Education, United States.

Seven volumes of Nature. From W. H. Mills. Esq.

Transactions of the Manchester Geological Society.

Pharmaceutical Journal of Great Britain. This journal is sent to the Library weekly.

Journal of the Asiatic Society of Bengal. Calcutta.

Transactions of the Royal Colonial Institute.

Scottish Geographical Magazine.

MEMO. OF RECEIPTS AND DISBURSEMENTS FOR
THE YEAR ENDING MAY, 1885.

RECEIPTS :—

Balance as at May, 1884.....	\$ 8 53	
Government Grant.....	400 00	
Sundry Subscriptions, etc	246 35	
		\$654 88

DISBURSEMENTS :—

Sec's Expenses, Stationery and Postage..	\$ 43 14	
Furniture, cases for Specimens, etc	156 00	
Rent	200 00	
Gas	10 40	
Printing.....	174 65	
Attendance and commissions	6 80	
Insurance	12 50	
		\$603 49
Balance in hand		\$ 51 39

RICHARD BULL, *Treasurer.*

W. H. BALLARD, }
A. T. NEIL, } *Auditors.*

THE EARLY HOME, SEPARATION AND RE-UNION OF THE ARYAN FAMILY.

BY REV. R. J. LAIDLAW.

Going back an indefinite number of centuries, let us suppose that a company of people from Great Britain have drifted in some unaccountable way to the Continent of America, and that all communication between them and their native land, is cut off. Coming to this continent, they establish themselves in the heart of the wilderness. They begin their new life with the speech of their fatherland, but here they come in contact with tribes speaking different tongues. They learn their speech, and in course of time have it so mingled with their own, that their language becomes materially altered. Then here they find trees, plants, animals and many other objects in nature, entirely different from those they were familiar with at home, and requiring different names. As years and centuries roll by, and they turn their attention to the tilling of the soil, and make new discoveries and inventions in the arts and sciences, they require still other words. And as they attend to matters of government in their new circumstances, they require new terms to express the various ranks and relations existing among them. In the course of eight or ten centuries the language of that people, if not their character and general appearance as well, will be completely changed.

In the meantime similar changes would be taking place in the old home. The use and the spelling of old words would be changed, and a host of new words would be introduced as arts and inventions multiplied.

At the end of a thousand years, let an Englishman and one of these colonists of English descent meet, and they will look upon each other as foreigners. They will be unable to understand each other's speech, and will never for a moment suspect that they are at all related. They will have certain words in common, but they will not at first discover this, as even those common words will be considerably changed in sound and spelling. The only words they will be likely to have in common will be names which were in use in England before the American colonists left their early

home ; and among these only names of things and relationships that have never changed in either country, such as *Father, Mother, God, Home.*

Now suppose that about the time those American colonists left England, centuries ago, another colony had drifted away in an opposite direction, say to New Zealand, and had been similarly cut off from their former home, and had similarly also come in contact with new tribes and new scenes, and during a period of say two or three thousand years had their character and language subjected to all such changing influences as had come over the character and speech of their cousins the American colonists. At the end of that period let a New Zealander meet with an American, and they will be barbarians to each other, and will never suspect that they have the remotest trace of common brotherhood.

Let us suppose that for several centuries the forefathers of these two people have been growing fewer and fewer in England, and that at last they all leave their native country and emigrate to America, taking with them one book, their English bible, in their own peculiar language. Of course that book cannot be read by the Americans, for they now speak a different tongue. But they entrust this sacred book to the custody of their priests, some of whom have learned the English tongue and can understand the book. In course of time the language of the book and of the English speaking portion of the people becomes a dead or unspoken language, and while the Americans and New Zealanders in their respective homes keep on speaking their respective tongues, the English bible lies in American monasteries unused.

At length, after the lapse of centuries, that old bible falls into the hands of a scholarly New Zealander who is travelling in America among foreigners as he thinks. He makes himself master of the dead language in which the book is written. He makes himself master at the same time of the language of the American people in whose custody he has found it. What is his surprise and delight to find that both the language of that people, and the dead language of that book are constructed on the same general plan with his own, and that the names of certain familiar personal relationships, and certain familiar objects in nature, and in common life are almost precisely identical in all three. They have all the same names for

Father, Mother, Brother, Sister, Sun, Moon, God, Home, Etc. On more critical examination he finds that the race to which he belongs and the race in whose custody that book is found are manifestly cousins. Their distant forefathers, of whom the writers of that old book were evidently among the last survivors, must have lived in the same country, speaking the same language, the original of which has been lost, but the later stages of which are accurately represented in the language of that book.

I have adduced all this for the sake of illustration. But, if you will substitute for the word *bible* the name *Rig-Veda*; for *Americans*, *Hindoos*; for *New Zealanders*, *Europeans*; and for *English* and *Great Britain*, *Sanskrit and the Aryan Plain*, you will have an exact description of what has actually occurred in the history of the Aryan race.

Within the present century the bible of the Hindoos has fallen into the hands of Europeans. That bible is a remarkable book. The first part of it especially, called the *Rig-Veda*, contains for us a wonderful revelation concerning our early ancestry. It was composed more than three thousand years ago, and pertains to an age as early as the days of Moses, if not as early as the time of Abraham, and according to some authorities, earlier. When its contents were first embodied in written form is not definitely known, but certainly not less than three thousand years ago. It is written in the Sanskrit language, a language which has been dead for over two thousand years. The book has been in the hands of the Hindoos for many centuries, but few, even of their most learned priests, have been able to read it. But its contents are now within our reach. Through the labors of such scholars as Colebrook, Wilson and Muller, it has been translated into our own tongue. And in the course of the study of the language in which it is found, the remarkable discovery has been made that we and a large proportion of the heathen Hindoos are cousins. Their forefathers and ours were one and the same people. At the time when the children of Shem were feeding their flocks in Canaan, or enduring bondage in Egypt, or wandering in the wilderness, or contending with the tribes that dwelt round about them, those peaceful sons of Japhet were dwelling securely on a great plain considerably to the eastward of the Semitic branch of the family. They called themselves Aryans, a name, the

meaning of which we shall presently note, and their country has been called the Aryan Plain. From the language of the Rig-Veda we learn not only the hymns they sang, but the kind of life they led. By means of that language we have the veil lifted from one of the most fascinating portions of the history of the human family, disclosing to us old scenes of romantic interest and surpassing beauty. To use the language of Farrar : "The discovery of Sanskrit has revealed to us a wholly new chapter in the history of the world's youth. It has enabled us to study the infancy of our race in the first gorgeous bloom of its imaginative passions."—(Families of Speech, p. 34).

From a careful study of the Sanskrit language, and an examination of words it contains, which are names of trees, mountains, streams and other natural objects, philologists have been able to ascertain the position of the original Aryan home. From such intimations as are found in these names, aided by a host of other concurrent circumstances, it may be assumed as almost certain that this early home of our forefathers, and of the forefathers of many of the Hindoos, was somewhere in the vast plateau of Iran, in the central part of Western Asia, in the quadrilateral which extends from the Indus to the Euphrates, and from the Oxus to the Persian Gulf. "In this region," says Farrar, "amid scenery, grandiose yet severe, where nature yields her treasures, but does not lavish them, lived a race unguessed at by history, unknown even to tradition, but revealed by philology,—a race which in a peaceful life, and under a patriarchal government, wrought out a language admirable for the wealth, harmony and perfection of its forms, and through which it learnt to acquire ideas, which were destined to bear fruit a hundredfold in the conquest, colonization, free institutions, and increasing Christian progress of the world."

From a careful comparison of that language with the language of Persia and India, and with all the languages of Europe, including our own, we can trace the course of the successive migrations which took place in early times from the Aryan home. The precise time of these migrations cannot be determined with any certainty, but possibly it may not have been earlier than 2000 before Christ, or about the time of the call of Abraham. These migrations were mainly two, one northwestward into Europe ; the other southeastward into Persia and India. "The causes which led to their migrations

from their peaceful home ;—the order in which they wandered forth to win new thoughts and conquer fresh countries ;—what drew the Norwegian and the Icelander ever farther and farther towards the inclement and pine-clad north ;—why the Celt first ensconced himself behind the storm swept cliffs of Britain ;—what happy destiny guided one great family to the plains of Persia and Hindostan, and another to the shores of the blue Mediterranean and the poetic hills of Italy and Greece,—we cannot tell. Whether it was the result of religious divisions, or physical convulsions, or civil feuds ;—whether it was caused by the natural growth of population, or by the irresistible spirit of enterprise ;—whether the tribes marched forth under different leaders in a succession of waves, each one driving its predecessor farther and farther from the original home,—all this is wrapt in oblivion ;—but the main fact is certain, that the parents of the Hindoos, and of the natives of modern Europe, did at an early date wander away from this common home.”

In the light of the science of philology, we can learn something definite as to the kind of life our early Aryan ancestors led some three or four thousand years ago in their happy home in the highlands of Asia. And first their very name tells us a part of the story of their life. They were *Aryans*,—a name derived from the Sanskrit root *Ar*, to open the soil,—to plough. We have this same old word in our own Bible. In Deut., 21 : 4, we read of a valley that is neither *ear*ed nor sown,—meaning neither ploughed nor sown. In Gen., 45 : 6, and Ex., 34 : 21, we read of *ear*ing and harvest,—meaning the time of tilling and of harvesting. Shakespeare makes the same use of the word when he says : “To *ear* the land that has some hope to grow,” (Rich. II, 1111, 2.), and again : “Make the sea serve them, which they *ear* and wound with keels.” We have the same word in the Latin *arare*, to plough, and in our word arable. All are derived from the original Sanskrit root *ar*,—to plough. The *Aryans* then were the *ploughmen*, and because ploughmen 4000 years ago, as now, were a goodly race, the word came to mean noble. We have a trace of the old Sanskrit name, *Aryan*, in the name Armenia, and what is more remarkable, in the names *Erin* and *Ireland*, the name of the most westerly point in Europe, to which those Asiatic ploughmen made their way.

If we learn in this way something of the employments of the men, we can from certain other words learn something of the occupation of the women of that early day. They kept cows in those days. The Sanskrit word for cow is *go*. Now take in connection with this the old Sanskrit word for girl. It is *duhitar*, which has come down to us through the Greek *thugater*, the Gothic *dauhtar*, until we have it *daughter*. Now this original Sanskrit name for girl, *duhitar*, is derived from a word *duh* (akin to the Latin *duco*) and means to lead or draw, and in Sanskrit to *milk*, revealing to us the fact that in our early Aryan home the daughters in the family were milkmaids, a fact, as Muller says, which "opens before our eyes a little idyl of the poetical and pastoral life of the early Aryans."

And this word *daughter* suggests to us the fact that in their early home our forefathers had the family relations in all its integrity. The words *father*, *mother*, *brother*, *sister*, and even *father-in-law*, *mother-in-law*, *brother-in-law*, *sister-in-law*, *son-in-law*, *daughter-in-law*, are all found in the Sanskrit. And as we trace the history of these words down through other languages to our own, we learn from them something of the nature of these relationships as they existed in the early time. For example, we find in Sanskrit the word *pitar*. In Greek we find it *pater*, in Latin *pater*, in Gothic *fadar*, and in English *father*. Now that original Sanskrit word, *pitar*, is derived from a root *pa*, which means to *protect*, revealing to us that in those early days the father was the *head* and *protector* of the family.

We find in Sanskrit the word *siv*. Trace its course down the stream of languages, and we find it in our word *sew*. We find in Sanskrit the word *ve*, which comes down to us as *weave*. So that which was woven is in Sanskrit *vap*; with us it has been changed to *web*. We see then that our ancestors 4000 years ago were acquainted with the arts of sewing and weaving. But I must not attempt here and now to trace out the whole history of our Aryan forefathers. Let me simply quote to you a few sentences from Max Muller. "If you find," says Muller, "that the languages of Europe have the same word for *iron*, which exists in Sanskrit, this is proof absolute that iron was known previous to the Aryan Separation. So with *house*, *ship*, or any other names. In this way it can be proved that before their separation the Aryans led the life of agricultural nomads—a life such as Tacitus describes that of the Ancient Ger-

mans. They knew the arts of ploughing, of making roads, of building ships, of weaving and sewing, of erecting houses. They had counted at least as far as 100. They had domesticated the most important animals, the cow, the horse, the sheep and the dog. They were acquainted with the most useful metals, and were armed with hatchets, whether for peaceful or warlike purposes. They had recognized the bonds of blood and the bonds of marriage. They followed their leaders and kings, and the distinction between right and wrong was fixed by laws and customs." (Sci. of Lang. I, 235).

The science of philology tells us something concerning the religion of the early Aryans. It furnishes us many specimens of the hymns they sung. The Hindoo religion of to-day, with its idol-worship, widow-burning, caste system, and transmigration of souls, professes to be the religion taught in the sacred books of their ancient ancestors. This however, is far from true. The original sacred book of our Asiatic ancestors is a pure book, on the side of virtue, and opposed to vice. It teaches that Varuna has established the eternal laws of right and wrong ; that he punishes sin and rewards virtue, is just, yet merciful and willing to forgive ; a judge and yet a father. "The Rig-Veda," says Muller, "knows nothing of the worship of idols." It teaches no such doctrine as the doctrine of caste, or of transmigration of souls, or of the burning of widows with the dead bodies of their husbands. All these are of later origin. The age of the poets who wrote the Vedic hymns, was followed by an age of collectors and imitators, that age was succeeded by an age of theological prose writers, and this last by an age of writers of scientific manuals ; and it is from all these after writings, the Hindoo religion has derived its most objectionable features. The early ancestors of the Hindoos were guilty of no such folly. They had not the same clear revelation of God which we have, it is true, yet our Aryan forefathers of the early time, worshipped the same God we worship, and sometimes by the same name. They called the Great Father *Dyaus* or *Dyu*, a name from which the Greek *Zeus*, the Latin *Deus*, and our own term, the *Deity*, have all been derived. They worshipped him under other names as well, one of the most common of which was *Varuna*, a name which has the same meaning with *Dyaus*,—the bright sky,—the Heaven. And they worshipped by sacrifice, as

their father Japhet did when with his father Noah, and his brothers Shem and Ham, he came forth from the Ark. It is an interesting thought, that in that ancient Aryan Bible, the Rig-Veda, we have perhaps the very religion which the pious Japhet taught his children, and enjoined them to teach to their posterity. Let me now read you one or two selections from those ancient Vedic hymns.—(See *Chips* from a German Workshop, vol. 1, pages 29 and 39.)

1. "In the beginning there arose the Golden Child. He was the one born lord of all that is. He established the earth and the sky;—Who is the God to whom we shall offer our sacrifice?

2. He who gives life; He who gives strength; whose command all the bright Gods revere; whose shadow is immortality; whose shadow is death;—Who is the God to whom we shall offer our sacrifice?

3. He, who through his power is the one King of the breathing and awakening world; He who governs all, man and beast;—Who is the God to whom we shall offer our sacrifice?

4. He, whose greatness these snowy mountains; whose greatness the sea proclaims, with the distant river; He, whose these regions are as it were his two arms;—Who is the God to whom we shall offer our sacrifice?

5. He, through whom the sky is bright and the earth firm; He, through whom the Heaven was established, nay, the highest Heaven; He who measured out the light in the air;—Who is the God to whom we shall offer our sacrifice?

6. He to whom heaven heaven and earth, standing firm by his will, look up, trembling inwardly. He over whom the rising sun shines forth. Who is the God to whom we shall offer our sacrifice?

7. Wherever the mighty water clouds went, where they placed the seed and lit the fire, thence arose He who is the sole life of the bright Gods;—Who is the God to whom we shall offer our sacrifice?

8. He who by His might looked even over the water clouds, the clouds which gave strength and lit the sacrifice: He alone is God above all gods;—Who is the God to whom we shall offer our sacrifice?

9. May He not destroy us—He, the Creator of the earth ; or He, the righteous, who created the Heaven ; He also created the bright and mighty waters ;—Who is the God to whom we shall offer our sacrifice ?”

HYMN TO VARUNA—(p. 39).

1. “ Let me not yet, O Varuna, enter into the house of clay ! have mercy, Almighty, have mercy !

2. If I go along trembling, like a cloud driven by the wind ; have mercy, Almighty, have mercy !

3. Through want of strength, thou strong and bright God, have I gone wrong ; have mercy, Almighty, have mercy !

4. Thirst came upon the worshipper, though he stood in the midst of the waters ; have mercy, Almighty, have mercy !

5. Whenever we men, O Varuna, commit an offence before the heavenly host ; whenever we break the law through thoughtlessness ; punish us not, O God, for that offence.”

ANOTHER HYMN TO VARUNA.

1. “ Wise and mighty are the works of Him who stemmed asunder the wide firmaments ; He lifted on high the bright and glorious heaven ; He stretched out apart the starry sky and the earth.

2. Do I say this to my own self ? How can I get unto Varuna ? Will he accept my offering without displeasure ? When shall I with a quiet mind see him propitiated ?

3. I ask, O Varuna, wishing to know this my sin. I go to the wise. The sages all tell me the same. Varuna it is who is angry with thee.

4. Was it an old sin, O Varuna, that thou wishest to destroy my friend, who always praises thee ? Tell me, thou unconquerable Lord, and I will quickly turn to thee, freed from sin.

5. Absolve us from the sins of our fathers, and from those we committed with our own bodies. Release Vashishtha, O King, like a thief who has feasted on stolen oxen, release him like a calf from the yoke.

6. It was not our doing, O Varuna, it was necessity (or temptation), an intoxicating draught, passion, dice, thoughtlessness. The old is there to mislead the young ; even sleep brings unrighteousness.

7. Let me without sin, give satisfaction to the angry god, like a slave to his bounteous lord. The Lord God enlightened the foolish ; He the wisest, leads his worshippers to wealth.

8. O Lord Varuna, may this song go well to thy heart ! May we prosper in keeping and acquiring ! Protect us, O Gods, always, with your blessings."

It only remains for me now to ask :—Why this great difference to-day between us, the children of the westerly branch of the Aryan family, and those Hindoos who are the children of the easterly branch ? Whence has our superiority come ? The answer is simply this. As our forefathers came westward they came in contact with that branch of the Semitic family, through which the world's best light and the fundamental principles of the highest civilization have been received. Whereas the portion of the Aryan family that went eastward, travelled farther and farther from the great centre of the world's light, and hence their inferiority. Let us talk no more then of the inherent superiority of the Anglo-Saxon race, and of the high destiny which as a matter of course awaits the nation that has Anglo-Saxon blood in its veins. Our blood is the same as flows in the veins of idol-worshipping Hindoos. Let us remember that it is only by what may be termed an accident that we differ from them. Had our forefathers happened to go eastward, and theirs to come westward, they would have been the Christians and we the heathens.

Let our hearts warm towards these Hindoos ; they are our own kith and kin. Let us cast our thoughts back to the time when their father and ours were brothers, dwelling peacefully together beneath the same roof in the delightful old Aryan home. When the two boys left home, the one to go east and the other west, I fancy they kissed each other at parting, the same father gave them both his blessing, the same sisters wept upon their necks, and the same mother looked long after them as she saw them taking each his several way. These two boys travelled far apart, the one to make his home in the extreme west of Europe, on the shores of the Atlantic, the other to make his home on the Indian Sea, in the central peninsula of Southern Asia. And between their children some of the fiercest and bloodiest battles on record have been fought. It

will be hard for some of Britain's sons to forget Lucknow and Cawnpore. But we are coming upon brighter times. The children who have been alienated so long, are now invited to sit down together, and look each other in the face, and revive the memories of early days by the light of the fire which the science of philology has rekindled on the old Aryan hearth ; and as they take each other by the hand again the meeting is like the peaceful meeting of Jacob and Esau after their long years of separation. Our millions of heathen cousins in India should be dearer to us to-day than ever they have been. An event has recently occurred which may be regarded as one of the most beautifully significant events in all the world's history,—I refer to our Queen Victoria's assuming the title of "Empress of India." We were not in the world when the dear old Aryan household was broken up and the family scattered, but we are glad to be present, after the lapse of some four thousand years, at the family re-union. We rejoice that our lot is cast in the day when our dusky uncles and cousins in India, and our fairer fathers and brothers in the isles of Europe, and we ourselves in this new western world, can join hands beneath the peaceful sway of the noblest daughter that has ever sprung from the noble Aryan stock, and forming a circle of brotherhood quite around the world, can shout sincerely, whether in Oriental phrase or in our own much-loved Anglo-Saxon tongue, "God Save the Queen."

SOME EVIDENCES OF COMMERCIAL TRANSACTIONS IN PREHIS- TORIC TIMES.

BY WM. KENNEDY.

FIRST PAPER—NON-METALLIC AGE.

Every year the student of commercial history obtains more information from those valuable publications issued by nearly every civilized nation in the world, entitled "Commercial Relation." In these volumes are to be found detailed statements with a multitude of figures showing the quantity and value of the articles sold to or

bought from the various countries with which the publishers of the volume have had dealings, and also in many are to be found the opinions of the Consuls regarding the state and prospects of trade in the different places in which they are located. Valuable information is thus given, and useful lessons are learned regarding the trade and history of the country. But, in addition to all this, and reading between the lines, as it were, we learn a lesson much more valuable to the student of man than any which may be obtained from pages of figures, however valuable—we learn the great lesson of civilization.

Above and beyond everything in bringing men together, in knitting and uniting them in the great bond of brotherhood, and in teaching men to recognize in each other, a brother, independent of his country, his race, his color, or his creed, commerce stands beyond a rival; without fear or without envy, she is always ready to welcome any means whereby the end she has in view may be attained. Commerce is the elder sister of civilization. As stones in the earth remain for ever angular, while in the brook or river, by coming in contact as they roll along with the stream, here gently pushing, there knocking violently against each other, they are smoothed and rounded into the pebbles we find and admire for their roundness and and polish, so it is with men. Man isolated from his fellows remains in an almost stationary condition, sometimes retrogressing, scarcely or never progressing, and always retaining his angularities. Bring him into contact with other men, throw him, as it were, into the river, and soon we find him beginning to move forward with the great stream of life, and by and by we find him occupying his proper position among the people of the world.

The great lever moving the world is commerce. Go where we may, from zone to zone, in the most highly civilized nations, or amongst peoples of the lowest grade we continually find her opening the way, unbarring the gates, and making the path smooth for her younger sister, civilization, leading her gently over the dangerous places, and pushing her boldly forward where chance or necessity may occur. The birthday of commerce is an unknown period, and her age, a time not to be measured by years, nor by centuries, nor yet by cycles. The oldest peoples of which we have any record at all had a certain amount of commerce existing amongst them, and even the rudest savage of the present day betrays his knowledge and

longing for it by being always ready to open up a trade ; while the most polished and highly civilized nations have often resorted to war to maintain their right to trade.

In the following pages I have endeavored to show some, a few it may be, of the transactions of commerce in times far back, beyond the publication of "Blue Books or Commercial Relations," and even beyond the days of written records. I do not suppose, however, that I have reached the beginning, in all probability I have commenced in the middle of the history, and I confidently look forward to, and expect a time when the explorations in the Eastern world, and fuller examinations of the monuments of Europe will show us a record which will place the few traces I have here presented in what might be called modern times. This continent will also, without doubt, when thoroughly known, widen the lines of evidence as already known, and give us proof of the existence of a commerce dating far back into the misty realms of the past.

Man, by nature is always counting his successes, calculating his gains, and looking to his losses—always looking to the future profit and neglecting or overlooking the past. So it is when the reader of the newspapers of the present day turns to the financial reports and mentally calculates how much the richer or the poorer he has become during the night, as the particular class of stocks or shares in which he has invested has risen or fallen in the share market. He is not apt to let his mind wander back through the past, and think of the times when joint stock companies were so far in the future as not even to be dreamed of by the most ardent progressionist when every man was his own banker and broker, when nations had not learned to raise a revenue by the imposition of a customs tariff or excise duties, or borrow from their neighbors by the issue of "Consols" or debentures, or even by war indemnities; when the conqueror repaid himself for his trouble and annoyance by carrying off whatever part of the property of the vanquished he could obtain ; nor of the time when the internal revenue of a country was paid in service.

Nor are we, of these days of rapid transit by steam and electricity, likely to give more than a passing thought to the time when a short journey was a thing to be carefully considered before being undertaken ; when the whole commerce of the world was carried on

by long trains of horses or camels, occupying days, or even weeks on a journey which is now done in as many hours ; when the eastern trade was solely in the hands of the Arabians and Egyptians, and the Phœnician tugged laboriously at the oar in his westward journeyings toward the land of tin.

Still less likely are we to look even farther back to the time when the useful horse, and the equally useful camel were unknown in the work of men ; where the common carrier consisted solely of the manufacturer and the seller ; when labor knew no divisions—the maker being also the vendor, carrying his wares himself from place to place, from tribe to tribe, giving what he had for what he could get in return, and doubtless often surrendering his wares to a stronger and less scrupulous rival, who considered “might right,” and who effectually closed up the opposition, and the weaker merchant’s mouth, by a process which recognized the fact that “dead men tell no tales.”

As we daily handle the coins and moneys of the land we may be residing in or passing through, we probably never for a moment think of the times long past when paper was not, nor had coins themselves even been thought of ; when all commerce was carried on by barter, and when even the precious metals were unknown for any other purpose than that of ornament. Coinage is a comparatively modern invention, being first introduced by the Lydians about 678 B. C. Strange though it may appear, the Assyrians had no knowledge of coin, and the earlier Egyptians, with all their exhaustive and highly finished civil and religious polity, do not appear to have had any higher commercial facilities than barter.

Yet there were times much earlier than these ; times long before the spices of the East, the tin of the West, or even the gold of Ophir were considered of any mercantile value ; and yet, even then, the love or necessity of trade was in existence. The unwritten history of our race as read by archæologists, place before us unmistakeable evidences of the ancient inhabitants of Europe carrying on a species of commerce in stone for implements and shells for the manufacture of ornaments, and also in later times of copper and tin for the manufacture of bronze. Explorations in the caverns of central France have disclosed traces of the Flint-folks belonging to an era estimated by some scientific chronologists as antedating our

own by 100,000 years. Professor Dawson, however, states with good show of reason, that man could not possibly have existed in either Europe or America at that early date, and that probably none of these cavern deposits date further back than 6,000 or 7,000 years at most. At a recent meeting of the French Association at Grenoble, M. de Mortillet read a paper on Tertiary Man, in which he affirmed the existence of man in the Tertiary Period. A number of flints were exhibited from both the upper and lower Tertiary, which had been intentionally chipped and exposed to fire. These traces, so far from bringing us any nearer the original ape, show man in his earlier stages to have been a being in many respects superior to some of the savages of our own time. He was a man, and as such no doubt had trade dealings with his fellow men, although at present the evidences are not known.

In America also, we have in the same unwritten history, testimony of commercial relations existing between widely extended and far distant tribes or communities. We find the natives of the coast exchanging their shells for the metals of the north with the inland tribes; the inhabitants of the plains exchanging dried meats and other products of the chase with the laborious mining population of the region of the Great Lakes, while the agriculturalist of the south carried home with him copper in exchange for his *zea* maize and tobacco.

This prehistoric man—this dweller in caves, crouching before the entrance of some water worn cavity in the side of a rock, engaged in the chipping of flint into implements, either for his own use, or for the purposes of bartering with the other men of his time, was the business man of the day, and the progenitor of the merchant princes of the present time.

The transition from the one to the other—from the rude implement maker fashioning his stock in trade out of the hard flint, to the Whitworths, the Armstrongs, and the Montcrieffs, engaged in manufacturing the hundred-ton guns and all the other modern implements of war, is a great one, and is the result of the work of a great many centuries. The change from the dwellers in countries producing the favorite stone for the axes, chisels and other implements of war or the chase, carrying their wares from place to place wherever they might be wanted, to the present day, when steamboat

and rail are daily pouring millions of pounds worth of articles into the various great markets of the world, is equally great, and occupied a corresponding length of time.

No estimate of the time necessary for the carrying out of such a change can be given, or even guessed at. There are no means of knowing. In tracing the course of this great transition time relative can only be used for a period which must necessarily have occupied several thousand years, and if it be found that the man of the Tertiary Period had commercial intercourse with his neighbors, then the thousands may be indefinitely increased. We have written history of commercial transactions occurring some two thousand years before the birth of Christ, and traditions going several centuries still farther back. In the Imperial museum at St. Petersburg, there is a Chinese bank note dating from the 2200 year B. C. As the Chinese of that period were in possession of paper money, we may infer that their commerce was at least several hundred years older. Of the trade in the days of the flint worker, however, we have no such evidence as in the case of China, but only the evidences left behind him in his works; numerous specimens of which have come down to our day.

Beginning then, at the earliest links in the chain of which we have any evidence whatever, we may with propriety consider the proofs produced by Archaeologists in favor of the dwellers in pre-historic times having had a certain commercial relation with each other, although in many instances widely separated. Of the fact that these people had such relations with each other, the evidences, although not many, are indisputable. They may be treated under the following five divisions, which, I think, embraces nearly all the various proofs which can be offered :

First : We frequently find articles of various kinds belonging to both the so-called first and second stone periods in positions which, apart from their form, the geology of the districts shews, must have been carried by some means from the native home of the material to the place where the article is found.

Second : The carriage of the raw material or manufactured implements must have been performed by human agency, the undisturbed character of the deposit in many places being such as to

exclude any theory of the carriage being effected by floods or other geological changes.

Third : In addition to implements of war or agriculture, or the material for their manufacture, we frequently find many articles of a tender nature, such as shells and mica, which would from their composition be destroyed by the rough usage they would naturally be subjected to if transported by any other means than by man, and even then the owner must have considered them of such value as to induce him to carry them in as careful a manner as he possibly could.

Fourth : We frequently find metallic specimens in localities far removed from their native rocks. These metals are often in pieces, just as they had been dug out of the mine. Very frequently they shew traces of having been hammered or subjected to fire, and often worked into the shape of articles of jewelry or ornaments, some showing in a high degree the artistic skill of the ancient workmen.

Fifth : In addition to specimens of simple metals, we frequently find what may be considered the strongest proofs of commercial relations between prehistoric peoples :—these are specimens of their handiwork in compound metals or alloys. These articles are chiefly of bronze.

There are few traces of a Bronze Age in North America. This metal is confined almost exclusively to Europe. The absence of bronze among the North American tribes, or peoples, may be accounted for by the scarcity of tin, none being then known on this continent outside of Mexico and Peru, and an analysis of the bronzes of these peoples shews them to have been more sparing of their tin than were the Europeans. Although articles of copper are frequent in the mounds of the Mississippi Valley, I have been unable to find in any of the authorities consulted any reference to the finding of a single article of bronze. Mr. Tylor, in his address to Section H (the Anthropological section) of the British Association, at Montreal, in 1884, says : “In connection with ideas borrowed from Asia there arises the question, How did the Mexicans and Peruvians become possessed of bronze ?” and answers it thus : “Seeing how imperfectly it had established itself, not even dispossessing the stone implements. I have long believed it to be an

Asiatic importation of no great antiquity, and it is with great satisfaction that I find such an authority on prehistoric Archæology as Professor Worsaae comparing the bronze implements in China and Japan with those of Mexico and Peru, and declaring emphatically his opinion that bronze was a modern novelty introduced into America. This is decisive enough in shewing that during the age of bronze in Mexico and Peru, there existed a trade relation between these peoples and China and Japan. How, or why this relation did not bring bronze into greater repute, and cause it to spread amongst the other peoples of America, it is very difficult to say, unless these nations did not trade with the more northern peoples. An interesting corollary to these evidences of there having existed a prehistoric commerce may be here stated. The prehistoric peoples of both continents had in a measure formed a sort of division of labor at an apparently early stage of their history. A man who shewed any peculiar aptitude for any special line, generally confined his efforts to the manufacturing of that particular class of articles ; thus, any one who proved expert or skilful in the manufacture of arrow heads, devoted himself to that branch of business, while the makers of totemic emblems or ornaments, confined their attention to the manufacturing of these articles.

Archæologists state there were three different ages though which men passed on their march of civilization viz : the Stone Age, divided into the Palæolithic and the Neolithic, the Bronze Age and Iron Age. Some are in favor of adding a fourth, or age of transition, between the Stone and the Bronze Ages and distinguishing it as the Age of Copper. Evidences have been adduced by Archæologists of there having existed a Copper Age in Hungary, and many proofs are also shown of such a period having indured for a long time in North America. During its existence on the American Continent it was a period of great activity among the tribes then living.

An important consideration in all matters relating to commercial pursuits, is the facility for the carriage or distribution of the articles to be disposed. It would be of little use for anyone to produce an article he did not want for his own use, had he no means of disposing of it. If his immediate neighbours had no desire or requirement for the article, then he would be compelled to find some other market more or less distant from the place of manufacture ; but to

enable him to sell his products in a distant place, he would require to have some means of carrying them there. Without means of conveying merchandise from one place to another, all sorts of traffic would be seriously impeded, and no doubt the insufficient and also very hazardous modes of carriage, would to a great extent, interfere with prehistoric man's commercial proclivities, but did not, as we shall see, altogether keep him out of trade.

The readiest and easiest mode of carriage would naturally be by water; hence we find the rivers of a country were the great highways of early commerce. Of the value of water as a means of communication prehistoric men were by no means ignorant, and we have many evidences of primitive skill exhibited in the numerous canoes which have been discovered in Great Britain, notably in the estuary of the Clyde. In the district in which Glasgow now stands, no less than seventeen canoes of various sizes have been discovered, and what is now one of the greatest seats of shipping and ship-building in the world appears to have been even in prehistoric times the seat of a large population skilled in the science of navigation. The earliest race in Scotland of which any traces are to be found, were essentially a nautical people. Numerous evidences of their seafaring propensities have been found in various parts of that country. Whether these canoes were used simply for coasting or fishing or for the purposes of a long voyage it is difficult to say, but one circumstance connected with the discovery of these vessels and peculiarly interesting in any inquiry into the commercial relations of these ancient navigators, is the fact mentioned by Dr. Wilson in his *Prehistoric Annals of Scotland*, that one of the canoes found near the present site of the city of Glasgow had a hole cut in the bottom evidently for the purpose of drying the boat. This hole was neatly filled by a plug not made of the wood of the district, but of cork. Cork is a native of the Iberian Peninsula, and must have been brought to the place where the canoe was found by some means—evidently by trade in some way or other. Had it drifted there by the sea current, a circumstance extremely unlikely when the distance and position of the land past which it must have floated is considered, it is very doubtful whether the ancient boat-builder was provident enough to gather driftwood to serve his purposes. Unless brought to him directly by some means he would be more

likely to make his plug out of the same material as his boat.

It is to the alluvial clays, gravels and other drift material filling the valleys of the different rivers throughout Europe and America that we owe most of our knowledge of man in the earlier stages of his career. Lakes, estuaries and the sea-coast have each contributed a little towards our store of information, but not to such an extent as the drift filled valleys of ancient rivers. It is, therefore, to these ancient valleys we must look for the earliest records of commerce, and consequently of civilization.

Nearly all great movements in the history of man have taken place along the courses of large streams. In our own times we find this to be the case. A new people entering a country naturally settle upon the coast and river valleys first. In America we find the white race settling first upon the sea-coast, next gradually pushing their way along the courses of the great rivers, the St. Lawrence, Hudson, Mississippi and others, and finally when they have obtained the complete control of these highways, they push back into the country. This course is useful to settlers in two ways,—in providing security for themselves in the event of disaster in their intercourse with the natives, and also providing a means of outlet for their products, navigation being looked upon as essential to their commercial prosperity.

As is the case now, so it was in the prehistoric ages. The rivers of Scotland, England, France and Italy, in Europe, and the Mississippi, Ohio, Hudson, and St. Lawrence all give conclusive evidence that primitive man was perfectly acquainted with the value of water as a means of transportation. When man first made his appearance in Europe, the principal rivers stood at a much higher elevation than at present. They had not then cut the deep channels through which they now run, and what is now the vale of Clyde, with a river running through it, was then an estuary of the sea.

Considering the numerous facilities for water carriage on the American Continent, it would be somewhat surprising if the prehistoric inhabitant had not used that means to move from place to place, as his roving nature might prompt him.

M. Joly, in a recent publication, "Man before Metals," says : "It is impossible to doubt that the first attempts at navigation date from the Archaeolithic Age, when we find buried twenty or thirty

yards below the beds of rivers in Scotland, England, France and Italy, canoes still containing the stone axe with which they were dug, and lying beside the bones of men, and of the elephas primigenius or mammoth, with which they were contemporary. These canoes were from ten to fifty feet long, and from two to fourteen feet wide." M. Joly considers the use of these canoes for long trading voyages an impossibility, yet on the same page he gives an instance of canoes being used to carry flints from France to the islands of Elba, Sardinia and Pianosa, and also of men bringing from Sardinia to the other two pieces, of black obsidian rock, foreign to these islands, from which the natives made knives as sharp as those of Mexico.

The ancient Americans used canoes for long trading voyages, and the Peruvians understood the use of sails and the rudder. Columbus when on his fourth voyage, landed on one of the Guanaja Islands, and while there saw a large trading canoe, which from the statements made by the cacique on board, was supposed to have come from Yutacan, a distance of about forty leagues, and over a sea, the tempestuousness of which daunted even the hardy sailors of the Spanish fleet. This canoe although formed out of a single tree, was about eight feet wide, and had twenty-five rowers. In the centre of the canoe there was a tent or awning, under which the cacique and his wives sat. Bartholomew Ruiz, the pilot of the expedition for the conquest of Peru, encountered in the open Pacific, a Peruvian balsa, formed of huge timbers of light porous wood, with a flooring of reeds. This balsa had two masts which sustained a large square cotton sail, and was constructed with a movable keel and rudder. On board Ruiz found ornaments wrought in silver and gold, vases and mirrors of burnished silver, curious fabrics both of cotton and woollen, and a pair of balances made to weigh the precious metals. The balsa had come from a Peruvian port, some degrees to the south, and the crew consisted of both men and women, and carried provisions for the voyage. Here then we see that the natives of Yutacan were accustomed to take long voyages in canoes, and that the ancient Peruvian navigators understood the use of sails and the rudder.

The Polynesians, long before the advent of whalers and trading vessels in these seas, are known to have had intercourse with each other. The Tonga people are known to have had dealings with

Vavao, Samoa, the Figi Islands, Rotuma, and the New Hebrides. Messrs. Forster and Cook obtained from a native of the Society Islands, a map which has been shown to contain not only the Marquesas and the islands south and east of Tahiti, but the Samoan, Figi, and even more distant groups, and the Hawaiian islanders appear to have had considerable knowledge of navigation. One of the headlands of the Hawaiian Islands bears the name of the *Starting Place for Tahiti*, the natives having at a certain season directed their course towards Tahiti by a particular star.

Now in the face of these instances of other people having understood navigation to such an extent, is it not reasonable to suppose that prehistoric man in Europe, particularly those of Britain, had a knowledge of the same mode of locomotion, and that they used this knowledge to aid them in their commercial dealings with each other.

Although water would naturally present itself to early man as the most convenient mode of locomotion, long journeys by land do not appear to have been by any means uncommon. Amber has been found in Switzerland, and no doubt, found its way there by means of internal trade, or probably by means of periodical journeys by the tribes inhabiting that part of Europe. These periodical journeys were by no means of an infrequent occurrence among the tribes of North America, even down to comparatively modern times, So late as 1859 when Professor Hynd was on the Saskatchewan, Chief Shortstick, of the Plain Crees, pointed out to him some members of his band who had gone to the Rocky Mountains two years before, and had returned with several scalps, grizzly bears' claws, necklaces and pipes. From the articles brought back, it might be inferred that these Indians did not go so far for trading purposes alone, and their trophies were largely obtained in the manner which some writers have styled "compulsory exchange." Men engaged in hunting and whose mode of living was nomadic, would not be likely to be afraid of the hardships of a long journey. Jade has been found in various parts of Europe, indicating either an extensive system of exchanges or long journeys by land or river, the native home of this mineral being in China and Central Asia.

The various Indian tribes were in the habit of making periodical journeys to the Coteau des prairies for the purpose of obtaining supplies of the red pipestone for which that district, even in early

times, was famous. Another evidence of primitive man undertaking trading journeys is the tradition preserved in Georgia "that among the Indians who inhabited the mountains, there was a certain number or class who devoted their time and attention to the manufacture of darts: that as soon as they had prepared a general supply, they left their mountain homes and visited the seaboard and intermediate localities, exchanging their spear and arrowheads for other articles not to be readily obtained in the region they inhabited. The further fact is stated that these persons never mingled in the excitement of war, that to them a free passport *was* at all times granted, even among tribes actually at variance with that of which they were members; that their vocation was esteemed honorable and they themselves treated with universal hospitality.

We see, therefore, that the primitive peoples of the present day have a means of communicating with each other, and that prehistoric man had and used his means, limited as they may have been, for the purposes of communicating with his neighbors. Let us now look at the evidences of his commercial transactions.

Confining our attention for the present to the evidences in favor of a prehistoric commerce having existed in both the old and new worlds, to the five divisions already mentioned, let us consider these divisions separately throughout their different stages.

First: We frequently find articles belonging to the Stone Age in such positions as warrant us in assuming they were placed there by man.

In speaking of the Age of Stone or Bronze or Iron, it must always be borne in mind that these divisions are not in any case absolutely distinct periods in the history of the world generally, nor even with the one people, for, although they are to a great extent distinct periods in the history of a nation, they are not so absolutely. We often find the stone and bronze merging into each other, creating as it were, a sort of period of transition. In the same way we find the bronze and iron running side by side, even among the same people, and while we are in the middle of the Iron Age, some of the peoples of the world are still in the Age of Stone or merging directly from it into the Age of Iron. At the time of the discovery of America by Columbus, it was the Age of Bronze in Mexico and

Peru, Copper among the peoples of the Mississippi and Ohio Valleys, and Stone and Bone with the rest of the Continent.

I.—EVIDENCES IN EUROPE.

The earliest race of men, of which we have any record, has been denominated by Archæologists as Palæolithic man or men of the Drift period. These men were cave dwellers, and were the contemporaries of the mammoth, woolly haired rhinoceros, cave bear and cave lion. Their remains, which have been found in many of the caves in England, France and Belgium, as well as in other countries in Europe, show them to have occupied the greater part of Central Europe. Palæolithic man was not unacquainted with art, and several of the drawings exhibiting animals singly and in groups, give actual evidences of their imitative and artistic skill. Five skulls have been found showing the cerebral development to be such as will compare favorably with any of the modern savages. The physical characteristics of the skeletons of the Palæolithic men, show them to have been of large stature and great muscular development, circumstances which Dr. Dawson attributes "to abundant food, a temperate climate and roving habits in a wild country and without beasts of burden."

The ornaments of these cave dwellers were of ivory and shell, and their weapons or implements were for the most part, indeed, almost exclusively made of flint. Among the cave men there were weapons of reindeer horn, and a few have been found consisting solely of the lower jaw of the gigantic cave bear, man's most formidable enemy in that time. Flint was abundant throughout France, England and the Baltic provinces. The implements are of the rudest kind, being simply flakes of flint chipped from the block without the least sign of their being subjected to any kind of operation to shape them.

The reindeer were plentiful throughout Europe, and appear to have been the chief article of food with these people. They had a knowledge of fire and while some of the tribes appear to have had a knowledge of the art of making rude pottery, others had not. From this it would appear these tribes were widely apart and had little or no communication with each other. If they had we would hardly

expect such a useful art as the making of pottery could long remain unknown to the whole.

In all probability these Palæolithic men had some sort of barter between each other, but it must have been of a very primitive kind and not of very frequent occurrence, at least not so often as to make any appreciable difference in the social condition of the people. Flint though abundant in the south of England, there are many parts of Scotland in which it is scarcely to be found, yet in some of the ancient cists opened in these parts, arrow and spearheads of flint have been found, thus indicating some sort of a traffic in that stone. Dr. Wilson in his "Prehistoric Annals of Scotland" says "among the varied objects in the collection of the Society of Antiquaries of Scotland is a skull found in an ancient cist on the farm of Clash Farquhar, parish of Banchory Devenick Kincardineshire in 1822. In form and cerebral development it corresponds to a class of skulls found in the earliest caverns and barrows. In each corner of the cist a few flint flakes were carefully piled up into a heap." Here, then, it would appear that the earliest inhabitants of Scotland had a knowledge of trade and exercised it.

These large statured strong men were followed by a race of men much smaller physically, but of a higher type intellectually, and much better versed in the art of making implements. This second class has been designated as Neolithic men.

Of the Neolithic men we have more evidences of their having intercourse, not only with each other, but also with tribes of peoples occupying countries lying at a considerable distance from them.

It is probable that these people conducted their business at certain places agreed upon, and which were held to be neutral, or sacred territory. We know that such was the case in later times. Coteau des prairies was a sacred or neutral meeting place among the Indians on this continent at a very early period in their history, and continued to be so for long. It is supposed by some that the ancient copper mines on Lake Superior were worked by the various tribes under the same sort of guardianship or neutrality, and in addition to the chief purpose of mining, these mines were used as a place of barter, where the different tribes met for the purpose of exchanging their productions.

In contradistinction to the Palæolithic men, who do not appear to have been acquainted with agriculture in any form, and commerce only in a very limited way, we find the Neolithic men enjoying both in a certain sense. They also were more advanced in the way of art. Their weapons were richly carved and highly polished, and for their manufacture they employed not flint alone, like the Palæolithic men, but serpentine, jade, diorite, or any material hard enough to suit the purpose.

In the lake dwellings of Switzerland we find extended evidences of Neolithic commerce. By exchange from one hand to another, or by periodical journeys, they received coral from the Mediterranean; from the dwellers on the Baltic they bought the yellow amber, and from the East they obtained the valuable nephrite. Such of their arms as were made of flint were made of a species not known in Switzerland, but which must have been brought from either France or Germany. In their agriculture they employed various kinds of grain, such as barley, wheat, beans and millet. Some of these grains were grown in Egypt at a very early date, and it is believed these Lacustrians brought the seeds from that country. Baskets similar to those in use in Egypt have been found among the ruins of some of the Swiss dwellings.

The question of where the Neolithic men obtained the nephrite, of which their axes were made, has occasioned many contradictory statements. M. de Mortillet's first opinion was that this supposed oriental jade is simply a serpentine stone, more or less impregnated with silica, and formerly rather common in the Swiss Alps and the Apennines; but he now owns that no veins of jade which might have served to make the axes in question, have hitherto been found in Europe. M. de Quatrefages thinks that these nephrite or jade axes found in France and elsewhere, have been conveyed thither from Asia, by means of barter. Altogether, however, the eastern origin of the stone, and consequently an extended commerce appear to have the best of the evidence.

With coral, amber, nephrite, flint and grain, as articles of trade these lake men must have had widely extended commercial relations.

The flints from Grand Pressigny, found in Belgium, and green obsidian articles found in the valley of Vibrata, show that there was a trade relation between France and the Low Countries, and between

Italy and Bohemia. These men also carried on a trade in flint between France and the neighboring islands in the Mediterranean.

II.—EVIDENCES OF PREHISTORIC TRADE IN AMERICA.

The evidences of an extended commerce in the stone age on the American Continent, are much clearer than those of Europe. One cause for this may be that upon the arrival of the European in America he found the native races in the midst of their stone age or only emerging from it into the age of metals.

Prehistoric man in America had widely extended commercial relations during the age of stone. He dealt extensively in flint, slate, mica, red pipestone, shells, pearls, jasper and obsidian. According to Mr. Squier, implements made of the compact silicious stone of Flint Ridge, in Ohio, have been found in Kentucky, Indiana, Illinois and Michigan. In 1869, some children playing in the neighborhood of Fayetteville, St. Clair County, Illinois, found a deposit of fifty-two disc shaped flint implements. These implements were made of the stone from Flint Ridge. This fact shows conclusively that this stone formed an article of trade with the natives, and had been carried by them a distance of over 400 miles.

This Flint Ridge appears to have been the gigantic quarry from which the thousands of flint implements found scattered over so many states were produced. It apparently stood in the same relation to the worker and user of stone as the ancient copper mines of Lake Superior did to the worker of copper after the introduction of that metal as the chief article for manufacturing purposes. It was probably a sacred or neutral territory upon which all the tribes met on an equal footing, and at peace with one another, being at the same time a great fair ground or market place, in which the products of the various peoples were exchanged. It is hardly probable, judging from the quantities of spoiled and broken implements found in the neighborhood, that Flint Ridge was a seat of manufacture occupied by one tribe or people, in the same manner as the copper mines appear to have been.

Another species of stone, dealt largely in by the ancient North American, was slate. This slate is of a greenish shade, often marked with darker parallel or concentric stripes or bands. There are in the National Museum at Washington, objects of this slate

from the States of Massachusetts, Connecticut, New York, Pennsylvania, Ohio, Indiana, Kentucky, Illinois, Iowa, Louisiana, Michigan, and Wisconsin, and a specimen has been found in Missouri. The native home of this stone is along the Atlantic Coast, from Rhode Island to Canada. It is also found on Lake Superior and Green Bay. It does not occur in situ, in Ohio, where objects made of it are more abundant than in any other part of the United States, but water worn pebbles, some of them sufficiently large to form the objects found, are plentiful.

Obsidian was another article in which the prehistoric merchant dealt. The Geological Survey of the United States Government has ascertained that this mineral is found in Washington, Oregon, California, Idaho, Montana, Wyoming, and New Mexico. Extensive deposits have been found in the Yellowstone National Park.

Messrs. Squier and Davis have found articles of obsidian, mostly arrow heads, spears and cutting implements in five mounds of the Scioto Valley, in Ohio. Specimens have also been found in Tennessee.

Where did they get this obsidian? The Aztecs used it extensively, and it is probable the inhabitants of Ohio received their supply from that point. If so, they must have carried it a straight distance of over 1700 English miles, if however, they were better geologists or miners than we generally assume them to have been, they may probably have found their supply in the Yellowstone region. In that case the distance from Ohio would be over 1300 English miles.

From these evidences it will be seen that the stone folks of both continents had a sort of ill-defined commercial relation amongst the various tribes. Of the Palæolithic man of Europe, little can be said regarding his mode of exchange. Although the tribes were widely scattered, the physical characteristics of the men of the time were such that no doubt they often came in contact for the purposes of barter, or met in the chase or at war with each other. In any of these cases it is likely there was more or less exchanging of articles, while in the case of war the stronger would appropriate whatever he fancied or imagined he had any use for from amongst the property of his opponent, and in this way, no doubt, many of

the articles found in places very far from their place of manufacture, came to be present. Of the Neolithic man, however, we have much clearer evidence of his trading propensities and energy. The numerous articles of which he had a knowledge, and in which he dealt, were gathered from very widely separated parts of the world. It has been held by some archæologists that Neolithic man was a new wave of immigrants from the east, which entered Europe and supplanted the old Palæolithic inhabitants, and as such would bring with him his higher knowledge of art and manufactures, and also his supply of nephrite. He was acquainted with agriculture to a certain extent, and the seeds of the grains found may also have been brought from the east amongst the rest of his paraphernalia. If Neolithic man came from the east, his arrival in Europe must have been at a very early date. He must have left Asia before the introduction of iron into the region whence he came, as it can hardly be credited that a man acquainted with the use of iron would not carry that knowledge as well as some of the metal with him, but would voluntarily carry with him nephrite for implements, and abandon such a much more useful material as iron. One thing, however, he did not obtain from the east, and that was the yellow amber of the Baltic. It at least must have been the product of trade of some sort.

With such evidences as we have, we are forced to admit that the spirit of trade flourished among the men of the stone age in Europe.

In America, the whole evidence tends to the same conclusion. Whether this trade was a direct exchange of articles, or an exchange in such a way that the articles passed from tribe to tribe, there is very little evidence to show. The probability is that in some cases it was a direct exchange after the manner of the tribes of the mountains of Georgia. If such was not the case, then trade must have been very intermittent and often at a standstill, as the frequent wars between neighboring tribes would, while they lasted, completely put an end to anything like the exchanging of articles from tribe to tribe. Such articles as did find their way into the other tribes would be the spoils of victory, and would in that case be more or less likely only such as would help the victor to carry on war.

SECOND : The carriage of the material or implement must have been performed by human agency. The undisturbed character of the deposit in many places being such as to exclude any theory of the carriage being effected by floods or other geological changes.

Many of the articles belonging to prehistoric man are placed in such positions that no theory of their having been so placed by geological changes, either in the shape of floods, or otherwise, is tenable. It is quite true that many of the articles found are of such an imperishable nature that they would admit of being rolled about or carried along with other debris by rivers overflowing, or by the articles themselves being dropped by some prehistoric hunter or fisher into the water. Yet we find that most of the discoveries have been made in such positions as to preclude this view.

Amongst the Palæolithic men when the weapons of war and implements of all sorts consisted simply of chips or flakes of flint, no doubt very little care would be taken of them. These flint flakes were in most instances so easily obtained, and of so little value, that the Palæolithic hunter or warrior would not consider them worth the trouble of carrying any great distance, but would throw them down wherever used, and depend upon obtaining another knife or axe when he next needed its use. It would be different with the Neolithic men. Their implements were highly finished, often elaborately decorated with carvings, and required a long time, and great expenditure of labor to produce. Neolithic man would therefore be more careful in the use of these articles, hence it is we find more of the productions of the polished, than of the rough stone period, and they are always found in positions which show that they were placed there with great care. It is to this carefulness of the Neolithic man that we owe most of our knowledge of his mode of living and his commercial relations.

It is in prehistoric burying grounds, in the Barrows, Dolmens, and Tumuli, we find the most complete records of ancient man's manner of living, and in them have been found many evidences of commercial relations having existed between the different tribes at the period the grave was made. To the almost universal custom existing among the prehistoric tribes, of burying with the dead, his arms, ornaments, and every article he had valued during life, archæologists are indebted for much of the information they now

possess. When a man died it was necessary, according to the religious belief of the time, to bury his property with him, in order that he might make a respectable appearance in the next world, and with that object in view, nothing was considered by the deceased's relatives as too valuable to be placed in the grave, hence it is that so many really beautiful and valuable articles have been found in the various burying places which have been opened.

The evidences are very numerous, much more so than space will permit, we will therefore confine ourselves to a few of the leading cases.

I.—EVIDENCES IN EUROPE.

We have seen that among the Lacustrians, in Switzerland, the trade consisted largely of amber, nephrite, flint, coral, and grain. These articles had to be brought from widely different directions. The amber from the Baltic, the nephrite from Central Asia, while the coral and grain came from the Mediterranean, and probably Egypt.

Now no geological change that we know of can be credited with the carriage of these articles from their original localities to where found. If it were possible for such to be the case, then we might expect similar articles to be found in other parts of western Europe; but we have no record of any such discoveries except in dolmens.

In many parts of Scotland urns containing flint arrow heads have been found placed within ancient cists, showing that the natives must have attached a considerable value to them.

In the caves of France and Belgium, numerous evidences have also been found, denoting the value placed upon various articles, and the great care exhibited in placing them in such positions that the dead man should not want anything when he arrived in the next world.

Ancient man in Europe built his tombs in a substantial manner. The cromlechs or dolmens were constructed of heavy upright stones, with others placed horizontally to cover them, so as to form a sort of rude vault or chamber, which was in most cases enclosed by a tumulus or mound of earth, and reached from without by a passage formed of stone. These chambers are sometimes of large dimensions, and the

stones which form them of such size and weight, that considerable speculation has arisen as to how these primitive men with so small a knowledge of mechanics were able to put them in the positions in which they are formed. The large chambers formed the last resting place of numerous bodies, and the corpses, in order to occupy as small a space as possible, were deposited in a sitting or contracted position, surrounded by the articles their friends deemed necessary to bury with them.

Caves were also used as burying places. In 1862 Dr. Noulet visited the cave l'Herm, and along with the remains of about thirty human skeletons found amongst other things, polished axes of Jade, a few necklace beads and a ring of bronze.

In many of the dolmens have been found serpentine pendants, necklace beads of the same materials, of slate, chalk, alabaster, jet, amber, a kind of turquoise and several kinds of shells. Discs made of the upper part of the *Cardium* and perforated for stringing. The dolmens also contain funeral urns, drinking cups and vases of tolerably fine clay, occasionally elegant, though not very varied in form. M. Cartailhac discovered in some of the dolmans in the department of Gard and Aveyron, red amber. Carved flints have been found in Elba, where that mineral does not exist in a natural state; arrows made of the black obsidian of Sardinia have been found in the same island, and also in Pianosa. A jade axe was found at Pauilhac, in the department of Gers, augite of Anevergu has been found in Brittany, and the green turquoise of Brittany has been discovered in several dolmens in the south of France. All these articles, of which the rough material is foreign to the country where they are found, prove that the articles must have been carried to the positions in which they have been discovered, by the agency of man, and that the men of the period had widely spread commercial relations with each other.

II.—EVIDENCES IN AMERICA.

We now turn to the new world for further proof of man's agency in carrying articles of commercial value for long distances. In the new world as well as the old, we are indebted in a great measure to the ancient custom of burying with the dead man his arms, ornaments and other personalities. In the mounds of Scioto and through-

out Ohio, as well as those in the Mississippi valley, various articles have been discovered, showing a spirit of commercial enterprise. These articles are placed in such positions as to put beyond doubt man's agency.

In the valleys of the Scioto, Ohio and Mississippi, there are numerous artificial constructions known by the name of mounds, and their builders have received the name of the Moundbuilders. According to Schoolcraft, the moundbuilders were the ancient Alleghanians, the oldest tribe in the United States, of which the tradition is distinct. This tribe had the seat of its power in the Ohio valley and its confluent, at a very ancient date. Here they had numerous towns and villages, and to this district they brought various articles which the archæologist now finds in the course of his explorations, and which we may safely assume as evidences of there having existed a commercial spirit amongst these people.

These mounds are of three distinct classes, each differing from the other, and apparently used by the original owners for different purposes. First, there is a class of mound known as the emblematic mound, designed to represent the armorial bearings of the builders. Second, the sacrificial mound, and third, the burial mound. In the sacrificial mound or altar, the construction appears to be different from the others. The special features of their erection are, they are built of alternate layers of gravel, mould, sand and slices of mica. They usually cover an altar of stone or baked clay, hollowed into the shape of a basin. In this hollow the offerings were placed.

Now let us see what kind of offerings were made: obsidian knives, thin slices of mica cut into various shapes and perforated for stringing, necklaces of beads, pierced teeth and of silver, earrings and armlets of bloodstone, lances and arrowheads of quartz, obsidian flint and manganesian garnet, articles of copper, bone and ivory, conch and other shells. Pipes are plentiful in these mounds and of various kinds, some of the brown pipestone of the Chippewa river, and others of the blood red pipestone of the Coteau des prairies.

We have already seen that the obsidian must have been brought a distance of at least 1300 English miles. Mica is not found in Ohio. The only places known to produce mica in North America are New Hampshire, Maine, Massachusetts, Connecticut, New York, Pennsylvania, Maryland and North Carolina. A species of mica is

also found in New Jersey and Canada. The nearest place, Unionville, Kentucky, being over 300 miles distant measured in a straight line. Neither bloodstone nor garnet is known in Ohio, but they may probably have been obtained from water worn pebbles. Copper and silver were obtained in the Lake Superior region.

The conch shell is a native of the coast of Florida and the West Indies.

In the burial mounds or tumuli, articles of a similar nature have been found. Mr. Rau describes in his article on the Stock in trade of an aboriginal Lapidary, the finding of a collection of Jasper ornaments in Lawrence County, Mississippi, consisting of four hundred and forty-nine articles, some of which were elaborately finished, others only partly wrought and others showing no work whatever. He adds by way of a note that no Jasper pebbles occur in the neighborhood of the place where the ornaments were found. According to the latest authorities, jasper is not found in the State of Mississippi. Some of the articles were of red jasper, which is found on the banks of the Hudson, at Troy and in Calaveras County, California. In an ossuary at Beverly, in the county of Wentworth in Ontario, Canada, Mr. Schoolcraft found sea shells which must have come from the south, eight armlets of red pipestone, from Coteau des prairies, in Minnesota, pipes corresponding with the antique pipe found at Thunder Bay and copper bracelets.

The positions in which every one of these articles have been found show they must have been placed there by man.

That no other agency could possibly do so, and the logical deduction is that man in America, at that period, had a widely extended system of exchange.

Now all these transportations of the various articles found, mean commercial relations between the existing tribes at that time. According to Dr. Wilson' in his "Prehistoric Annals of Scotland," the dolmens or cromlechs were the tombs of the chiefs, or great men of the tribe. Such tombs did not fall to the common lot, and if the native was not so honored, a stranger wandering amongst them would not be likely to be accorded such a distinguished resting-place. Therefore, a stranger carrying such articles with him, could not have deposited them in such positions. The fact of their being

so placed shows that these articles must have belonged to the tribe, and must have been obtained in the way of trade.

Third : In addition to implements of war, or agriculture, or the material for their manufacture, we frequently find many articles of a tender nature, such as shells, mica, etc., and which would, from their composition, be destroyed by the rough usage they would naturally be subjected to if transported by any other means than by man.

In the second division, I have just shewn that from the positions in which the various articles have been found, they must have been placed in these positions by man ; that no geological changes of any known description could have so placed them.

I will now try and shew you that from the very nature of the articles themselves man must have carried them from place to place in a very careful manner, and accordingly must have valued them highly.

All savage or rude peoples delight in ornamenting themselves ; even the lowest classes of humanity are not without vanity in this direction.

Savage peoples are vain of the personal appearance, and whatever may be the standard of their ideal, they are ready to undergo any amount of what, to us, would appear inconvenience, and suffer acute pain to produce the desired effect. Thus we find the different peoples of the present uncivilized world fond of finery. Searching after his ideal beauty, we find the native of the Hermit group decorating himself with bracelets of large seashells, ornaments of a similar character around his neck and in his ears, piercing the septum of his nose, and suspending from it the teeth of a dog, or running a long piece of bone through it from side to side ; hanging human arm bones covered with feathers down his back, and painting himself in various colors. Again, we find the native of New Guinea staining his hair with red powder, adorning his flat nose with a pair of boar's tusks, and otherwise decorating himself with the bones of the cassowary and dog.

The inhabitant of Wottan perforates his ears with large holes, from which he suspends enormous earrings, ties a band of plaited grass around his arm, and suspends from it a bunch of feathers or hair.

The people of Api, one of the lowest in the scale of civilization, have peculiar modes of burial. They keep the body until decomposition sets in, when the bones are carefully removed, painted red, and wrapped in bark and buried. A stout post is fixed upright at each corner of the grave, and the sides ornamented with large shells, skulls, and bones of the dugong. In all cases these people tattoo and paint themselves. The present North American paints himself; the ancient inhabitants of Britain, according to Cæsar, dyed themselves with woad, and there is evidence that the reindeer hunter also decorated himself with paint, using the red hæmatite or oxide of manganese for that purpose. A shell full of red hæmatite was found in a cave on the banks of Gardon, and close to the shell a mortar, which had been used to grind the color and mix it with grease.

Now we have evidences shewing that what a man used or valued most during life was buried with him at death. We also know that what a man places the highest value upon he is most likely to take greatest care of, carrying it carefully, and perpetually watching, lest it be lost or injured.

Knowing this savage love of ornament and their habit of burying with the dead his personal effects, let us look at the contents of the various caves and tumuli, and examine the articles found. In these burying grounds we will find many substances, in the shape of ornaments, of such tender a nature as to preclude the idea of their having been deposited by any other agency than by man.

The beauty and great variety of marine shells no doubt were reasons for their being used as articles of personal adornment. They were used for other much more commercial as well as historical purposes among the tribes of North America.

Shells have been used in both the new and the old worlds as currency. The Cowrie shells, which are the most familiar to commercial students, are procured on the coast of Congo, the Philippine and Maldivé islands. Of the Maldivé group they form the chief article of export. The Philippine islands are in the Southern Pacific, and the Maldives in the Indian Ocean, yet these shells circulate as currency in Southern Asia, and almost into the heart of Africa.

Among the Chinook and other Indians on the Northern Pacific the dentalium forms not only an article of ornament, but considerable trade is carried on between the various tribes on Vancouver Island through the medium of these shells. The earlier writers on American currency give tabulated statements of the currency values of the white and blue wampum which were long used as current money in the transactions between the Indian and white races.

The Indian tribes, however, had other purposes to which they put the use of the wampum than that of either currency or ornament. It was used to record the history of all great operations of the tribe ; indeed Penn's title deed to the land purchased by him consisted solely of a string of wampum. Among the North American tribes this wampum was much prized and held sacred. It corresponded in its use to the ancient quipu of the Peruvian and Mexican.

Wampum consists of beads of different colours strung together, generally in the form of a belt. It is of two kinds, the white and the purple. The white is worked out of the great concho into the form of a bead, and perforated to be strung on leather. The purple is worked out of the inside of the mussel shell. They are woven as broad as one's hand, and about two feet long. At the close of the war between the English and King Philip in 1675, when Philip was killed, an old chief handed to Captain Church two broad belts elaborately worked in wampum. One of them reached from the shoulder to near the ground. This was the Magna Charta of the New England tribes.

The laws of the celebrated Iroquois league were recorded in wampum made of spiral fresh water shells strung on deer skin thongs or sinews, and these strands braided into belts or simply united into strings. These strings were the only visible records of the Iroquois, and were kept and interpreted by a specially constituted keeper of the wampum.

In the mounds of the Mississippi Valley beads and shells have been found in great quantities. In Grave Creek mound shell beads such as constitute wampum were found to the number of between three and four thousand.

No evidence appears as yet of shells forming a primitive currency among the ancient Europeans, although abundant proofs have been obtained of their being used as ornaments.

In 1838 an elevated knoll in the Phoenix Park, Dublin, was levelled. It was discovered to be a sepulchral mound, and contained two male skeletons and a quantity of the common *nerita littoralis*. These shells had been rubbed down so as to make two holes for stringing purposes. In a cavern at Aurignac were found eighteen perforated discs of the cardium. At Mentone were found pierced seashells surrounding the head of a skeleton. Shell ornaments were also found in another cavern of the same district. In la Madelaine pierced fossil marine shells have been found. At Cro Magnon pierced marine shells to the number of about 300 have recently been discovered, and at Trou-de-Frontal, in Belgium, pierced fossil shells have also been found. The *Cerithium Gigan-teum*, a shell of large size, cannot have been obtained from nearer localities than Rheims or Versailles.

The use of these shells has been assigned to ornamentation. They are all pierced for stringing, and bear a general resemblance to those used in America for the manufacture of wampum, both in the positions in which they have been found and in their manufacture. So close are the resemblances in some, particularly those ground into shape, that we might almost assume that they had been used as currency, or they may have been used as records in the same way as the wampum, even although no direct evidence of such having been the case is forthcoming. Whatever the uses to which the ancient man put his shells, he evidently valued them highly, and apparently took great care that they should accompany him on his journey to the next world.

Here, therefore, we have in one single article abundant evidences of the care with which man in early times looked after his valuables. But shells were not the only article of adornment or use in his possession. The tombs of each world—the old and the new, give us a list of many things highly prized by the primitive inhabitant, many of which he must have obtained by the way of barter or some sort of trade from his more immediate neighbors or from tribes many hundreds of miles distant.

I.—EVIDENCES IN EUROPE.

In various parts of Hungary, pearls from the Indian Ocean have been found. In the same country amber in the shape of beads, both wrought and unwrought, have also been discovered. In the lake dwellings of Switzerland, we have already seen that amber and coral in the shape of necklaces have been found. Fragments of pottery discovered among the ruins of the lake villages in Switzerland, are found to be coloured black by means of graphite. This mineral according to Dana does not appear to occur in Switzerland, but is found in various parts of Austria, Prussia and France, and it is likely these people brought their supply from some of those places. In the same ruins, beads of jet have also been discovered.

Without recounting the various articles found in the tumuli, or caves, one of the strongest arguments which can be adduced in favor of man's agency in the matter, is the finding of human skeletons entire in many places associated with the articles in which he had an interest in the way of arms or ornaments.

II.—EVIDENCES IN AMERICA.

Various articles have been found scattered throughout the different parts of the United States and Canada, none of which could have reached the localities in which they have been found by any other means than by man. Thus, the numerous plates of mica, cut in various shapes and sizes, found in the mounds of the Mississippi, and other valleys. The finding of the immense quantities of marine shells manufactured into ornaments throughout the Ohio valley. Messrs. Squier and Davis found in the mounds of Ohio the following species: *marginella*, *oliva*, *nautica*, *cassis*, *pyrula perversa*, and a large species of *conch*. All these shells belong to tropical or sub-tropical regions, and occur in the United States on the eastern shores of Florida and the Gulf of Mexico. Mr. Rau estimates the probable limit of the shell trade to be a distance of nearly eight hundred English miles. Mr. Schoolcraft states that he found in an ossuary at Beverly, in the county of Wentworth, Ontario, two specimens of shells, the *pyrula spirata* and the *pyrula perversa*, both of which must have come from the coast of Florida, and which were probably obtained by barter from the southern Indians. Shells from the coast of Florida and the Gulf of Mexico have been found over three thous-

and miles from their native habitat and several hundred miles from the shore. In the Huron gravemounds of the Georgian Bay, tropical shells from the Mexican Gulf have been found.

A very strong evidence of the Indian tribes in the days of the moundbuilders, having an extended commerce which might be treated under this head, is their agricultural advancement. They cultivated the *zea maize*, a tropical plant, which they brought with them from the south. Tobacco also supplies us with another proof of the same sort. Although extensively used by the various tribes in all matters of ceremonial, its cultivation was altogether confined to the area of the southern states, and from that district it was brought by the more northern peoples.

I have so far, except in one or two instances, when speaking of this ancient commerce, endeavoured to confine the proof of a prehistoric commerce to the age of stone. Brief the notices of the various evidences necessarily have been, but to my mind conclusive enough to show that the earliest peoples on both continents had, during the so-called stone period, whether we divide it into two epochs or treat it as a whole, a species of commercial relationship with each other. Limited no doubt it was, but still the spirit of trade existed and showed itself under the many adverse circumstances, by which it was surrounded. These people were undoubtedly a migratory class, hunting and fishing their simple though arduous and dangerous occupation; hunting especially so. When we consider the defenceless state of early man, the inefficiency of his arms, and the foes with which he had to contend, we can hardly wonder at the want of improvement shown by him in the earlier stages of his career. The descriptions given by Palæontologists of the two most formidable enemies of man—the cave lion and cave bear—show these animals to have been no mean opponents of man, even under much more favorable circumstances than those in which they came in contact. "Man," says Professor Boyd Dawkins, "disputed with the lion; sometimes man ate the lion and often the lion ate the man."

The rudiments of art were not wanting among the neolithic men. We find many of their implements and arms richly decorated with carvings of various sorts and often polished in a high degree. In addition, pieces of mammoth tusks and reindeer horns have been discovered, having rude drawings of various subjects cut upon them.

One great lesson we of these modern days might learn from those primitive peoples, is patience. The time they occupied in fashioning and decorating their implements out of the hardest of stones, must have been considerable, and modern examples might be adduced to show that the more elaborately finished articles were the work of several lives.

A modern explorer among the Pacific group of New Britain, describes the making of a stone implement thus : the native takes a piece of granite which he places in a slow fire of cocoanut shells, which gives an immense heat and allows it to become red hot. He then by the aid of a split bamboo, in the place of tongs, removes it from the fire and begins to drop water upon it drop by drop, each drop falling exactly upon the same place. That portion of the stone on which the water falls begins to crack and fly off until the heat is gone out of the stone. He then repeats the operation until an irregular hole is formed through the centre. He then fixes a stick through it and takes it to a large granite rock in which is a dint like a small basin ; he hits the stone on the rock until all the rough corners are knocked off and it is worn fairly round ; then takes the end of the stick and pressing the stone down into the hollow of the rock, makes the stick revolve rapidly between his hands, weighing it with other stones fastened to the top of his stick, until that side of the stone is worn perfectly round and smooth. He then shifts the other side of the stone downwards and works at that until both are smooth and even, choosing a handle of tough wood about four feet long, on which he fixes the stone with gum from the bread fruit tree, leaving about four inches protruding at one end beyond the stone. From this description we may infer how much labor was employed in the manufacture of the quantites of stone implements found in so many different parts of the world.

The fourth and fifth divisions of the subject bring us within the period when metals were the chief article of value. The old was giving place to the new. Men were abandoning their ancient mode of living and adopting more stationary habits. Agriculture was in a great measure displacing hunting and fishing as a means of subsistence. Many of the domestic animals which we use had been introduced, were making their way into the every-day life of the people,

and were beginning to be looked to more and more as the means of existence.

By the introduction of metals, a new era of commerce and consequently of civilization was commenced, and many interesting proofs of commercial advance could be given, but into these evidences we have not, for the present, time to look. They must therefore be left to the future, when probably we may be able to trace the course of commerce and follow her footsteps down to the time when written history steps in and assists us in our work of research. As it is, in the stone period we have seen men showing a spirit of trade. We have judged them by their own acts and have read their history, so far as we have gone, by their works and by their deeds ye shall know them.

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